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HONEY PRODUCTION IN THE SAGE DISTRICT

Notes on the Methods of a Well-Known Beekeeper Who Produces Honey on a Large Scale---By Frank C. Pellett

M. H. MENDLESON, of Ventura, Calif., is well known to the readers of the American Bee Journal. Beekeeping has been his life work and he is eminently successful. During the California short courses Mendleson was a center of attraction everywhere. Government experts and editors of journals received due attention, but it was easy to see that Mendleson, the man who had made such a conspicuous success of honey production under California conditions, was the man whose acquaintance California beekeepers were most anxious to make.

Mr. Mendleson has been a beekeeper since 1871 and has been in the business continuously in California since 1881. Few men have equalled the large crops which he has produced and none are more careful about the details of daily attention to the apiary or the preparation of the crop for market.

In our April issue, in connection with the story of California's first extensive beekeeper, J. S. Harbison, mention was made of the incident that started Mendleson to California. It was in 1876 that Harbison shipped ten carloads of honey to the New York market. Hearing of the shipment, Mendleson went to the city and saw the honey. He became so much interested in the possibilities of the west that he later left his home in New York and located in California, where he has since remained.

Mr. Mendleson tells interesting tales of the early days in California. On his first arrival from New York he entered the employ of Mr. Wilkin, at Sespe, where he spent two years. Wilkin was at that time one of the large producers of California honey. The trip to the west was an eventful one for young Mendleson. Reaching Santa Barbara by boat, he took stage for Santa Paula. Here he left his trunk at the stage office and started on foot to Sespe, 9 miles distant. About four miles of the distance had been covered when darkness overtook him, and he found the road had been plowed up. It is easy to imagine the feelings of the young man just from the East at finding himself lost in a strange, unsettled country. After wandering about for a time, he saw a light and in due time came to a shack occupied by a long-haired man with one arm who was living alone with his bees in a remote situation. In spite of the appearance of his host, Mendleson declares he was never better entertained in his life. The lone beekeeper was a well educated man, who shared his rough quarters with the wanderer. Next morning Mendleson continued his journey on foot. When he finally reached the Wilkin quarters he found a two-room shack. The family had come up to the apiary site to spend the summer months, leaving their home in Ventura. He found Wilkin also with long hair and beard and his wild appearance, together with the strange surroundings made the young man very homesick for a time. However, he found his employer to be genial and refined, and he was soon busy and content.

Getting supplies in and the honey crop out was a much more serious matter in those days than is the case now, with the fine roads and automobiles. Then there were no roads except mere trails, and of course horses furnished the only means of trans-

Interior of Mendleson's honey-house at Piru

portation. In 1881 they brought in the tin plate and made cans, in which to store the honey crop, right in the apiary where they were to be used.

Mendleson is located in the sage district of Southern California and for thirty years has been moving to the bean fields. Ventura County is said to have produced last season 72 per cent of the lima beans of the entire United States. Lima beans and the black-eyed beans are the two varieties which produce nectar in abundance. The black-eyed beans yield a dark amber honey, but of good quality. The honey from lima beans is almost water white and of fine flavor. Mendleson has secured as high as 150 pounds average per colony of this fine honey in a good season. A peculiarity of the bean honey is that it will sometimes sweat and ferment on the hives of weak or medium colonies near the coast. With strong colonies this seldom happens, even near the coast, and not in any case in the interior, where it is improved from being left on the hives. The bean honey granulates easily.

While Mendleson practices migratory beekeeping, he moves to the same location year after year and has a complete outfit at every apiary site. His Piru apiary is perhaps as widely known as any single apiary in America. Many photographs have been published showing this most attractive outyard. The model arrangement, with the background of mountains, makes a most attractive picture. Another illustration herewith shows the interior ot the honey-house at this yard. It will be seen that he has a complete power outfit with every labor-saving device.

He formerly made a practice of requeening all his colonies every two years. Since he has had to contend with European foulbrood he requeens every colony that does not build up quickly in spring, and never allows any queens more than two years old. With his 1,400 to 2,000 colonies the queen-rearing operations alone make quite a business. For this work he has a lady engaged who makes it a specialty. Women are well adapted to queen-rearing, as they are careful and painstaking, and there

A crew of women workers at the Mendleson yards

is no heavy lifting connected with this particular work.

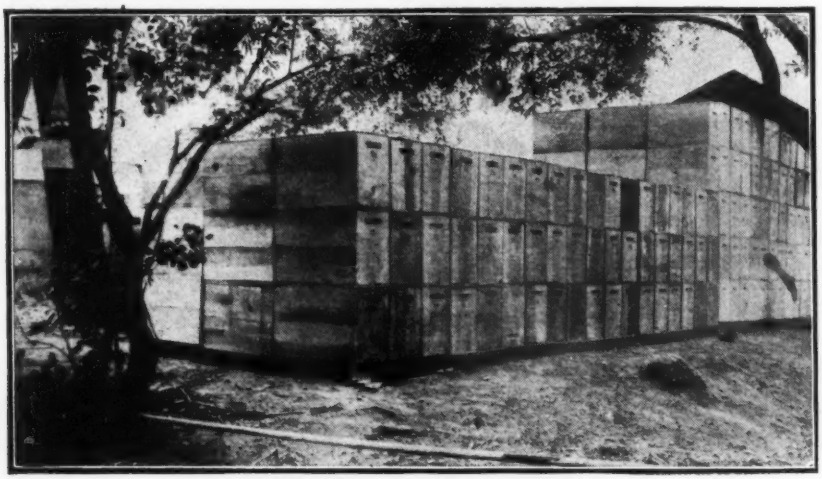
In the Mendleson apiaries women take a prominent place in the regular work. Our illustration shows a group of four of them in special farmerette suits. Except for the heavy lifting at extracting time and when moving the bees he finds the women make very satisfactory beekeepers. In addition to his crew of women beekeepers he hires one man by the year and gives a hand himself wherever help is needed.

It is his practice to leave about twice as much honey on the hives as will be needed in a favorable season. He insists that surplus left with the bees pays big interest, as it saves feeding in times of shortage and insures that brood-rearing will be continued at proper times, even though no honey is coming in. An abundance of stores and plenty of room in advance of the honey flow is the best insurance of a crop. More California beekeepers fail from extracting too closely than for any other reason. His largest crop was more than 100 tons and had he been able to get sufficient skilled help and enough cans to hold it he feels that this particular crop might have been nearly double. When a big flow is on it takes a lot of action to keep up with it with a couple of thousand colonies of bees.

In a good sage year it is possible to keep a lot of bees together without overstocking. The sage crops always come following wet winters. One year he kept 800 colonies in one yard. However, the sage often fails for two or three years in succession. When a flow does come the bees pile up the honey in a way to gladden the heart. He has had from one to five full-depth Langstroth supers filled on every hive in three days' time during such a flow, with an average of two such supers for the yard. There have been only two of these exceptionally heavy flows in his thirty-eight years of California experience. After the three days of heavy flow he was able to extract twice again six days apart and once more after another nine days of time. All told, the average was more than 300 pounds per colony from sage.

His bees work lightly all winter on the eucalyptus or gums, if the weather is favorable. However, there is little dependence to be placed on the honey from this source, and it is important to leave the bees with honey enough to carry them through. He gets his crop from sage in spring and moves to the bean fields about July 1. Although sage may fail, he regards the bean crop as almost certain. East winds sometimes blast the bloom of the beans, but this is rare. They bloom through a long period, beginning in July and continuing until September. The bloom is prolonged with irrigation. His average from beans is about 50 pounds per colony per year.

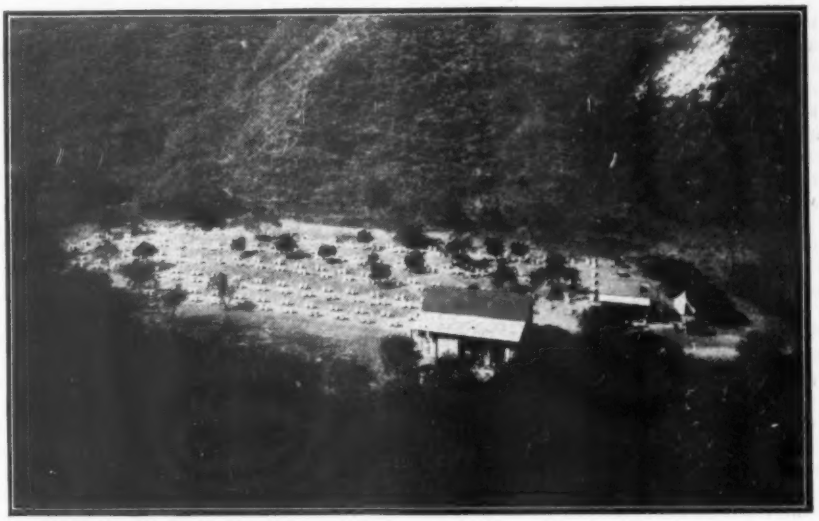
A special feature of the Mendleson equipment is the series of big tanks, four each holding seven tons, two eight tons and one ten tons, providing a combined storage capacity of fifty-four tons. In addition to these he has several four-ton tanks. After one disastrous experience, when he lost a considerable portion of his crop because he was unable to get cans, he decided never to let it happen again. The big tanks provide against any such calamity in future. With a crew of six men he has extracted and filled with honey a seven-ton tank every two days during the rush of a good season.



Thirty-ton crop in Mendleson apiary

One experience of a kind is always sufficient to insure that Mendleson will be prepared next time. When he had his first experience with American foulbrood he shortly cleaned it up and has always been on the watch for its reappearance. When European foulbrood came along, thirty colonies from all his apiaries was the highest loss in one season. Since then he has constantly practiced preventive measures, keeping his colonies strong and requeening frequently with resistant stock.

He puts up his honey in attractive packages and seeks the best trade, thus realizing better prices for his crop. He sells through only one dealer in one city, and supplies him year after year. On the whole, there are few beekeepers who might not learn some valuable lessons from M. H. Mendelson. When it comes to turning out the work, he can set a pace that makes a good man hustle to follow. On one occasion, as a test, he took off, alone, and extracted 1,500 pounds of honey in half a day.



One of the Mendleson apiaries in California

Beekeeping in Australia

(Concluded from August)

By T. Rayment

South Australia

In our previous article we dealt with "The West." Well, to proceed, we may travel east by the transcontinental line, one of the greatest railways in the world, which runs parallel with the southern coast, or, we may board one of the British mail steamers and disembark at Adelaide. To get back to the vernacular we are now in the Holy City" in "Southos." The latter is the Australians' affectionate name for the State of South Australia, and the former is the same worthy's cynical cognomen for the beautiful capital city renowned for its many churches. Before the Fereration of the States, South Australia was comprised of a band running clear through from the Great Southern ocean to the tropical seas of the northern boundary. After federation, the commonwealth accepted the northern half, which is now known as "The Territory." Your readers will now perceive the necessity for two sub-divisions.

South Australia is old in its ways; sedate is the proper word. It is the lucky owner of a calm exterior. It has a big range, heavily timbered, frowning down over the city, and its beekeepeers are a calm, good-tempered lot of people. But don't imagine that their staid behavior precludes them from effecting concerted action when it comes to disposing of their big crops—**and they do get big crops.** Don't forget what we have already said about the State, for all the bee-farms are in the southern portion. In South Australia the big crops are gathered from the ubiquitous "Gum trees" or Eucalypts. There are "Red" gum, (*E. rostrata*), "White" gum (*E. paniculata*), South Australia "Blue" gum (*E. leucoxylon*), "Sugar" gum (*E. corynocalyx*), "Pink" gum (*E. fasciculosa*) two or more "Peppermints" (*E. odorata* and *E. amygdalina*), "White" box (*E. hemiphloia var albens*), and last but not least, the remarkable and glorious pink-flowered *Eucalyptus calophylla var rosea.* Now you must experience a flow from the species named to appreciate the immense quantity of nectar secreted. Of course there are many other shrubs and plants, not forgetting that golden harbinger of spring, the "Capeweed," already mentioned. All day long the bees roar in the trees; mere humming is quite inadequate to describe it. When one remembers that there are hundreds of flower buds in a single group about two inches in diameter and that the whole tree resembles giant cauliflower when in bloom, some faint idea is gleaned.

The trees in South Australia are more dwarfed in general, but for pollen and honey they are hard to beat. Just at present the State Beekeepers' Association is in abeyance for reasans that are outside the ambit of these articles. Along the Murray river there are fruit gardens in abundance, but the exportable crops are the product of the gum trees.

At one time the South Australian Government interested itself in the export of honey from that State and, through its Agent General in London, made a contract with a leading firm of London caterers to place South Australian honey on all its tables. "Good biz," too. It also advanced so much when honey was on board ship. (By the way, the same State experimented with "egg circles," that is to say, the Agricultural Department organized a collecting system to gather the "hen fruit" of the farmers' "chooks")

There are many up-to-date apiarists in South Australia, but there is room for thousands more, and some day, when Europe quiets down and feels "sweetish," there is going to be a big banking account for some "Aussies."

"The Territory." Now let us tell you something about the northern part of the State now controlled by the commonwealth, named "the Territory," best known to the Southern States as the "Never Never."

In spite of all written to the contrary, central and northern Australia is not desert-like in any one particular. We have not traveled across Australia ourselves—dashed few have—but we have many photographs, and more, the actual experience of an ex-mounted constable who has "cobwebbed" the immensity of the Territory at all seasons of the year. There are mountains and great rivers and pasturing places that "run" stock by the 30,000 or 40,000 head. And there are Eucalyptus trees in abundance, and the ex-mounted man saw two and three bees' nests in each tree. Honey, wax and pollen in abundance.

But there we stop. The "Illumbria," as the black aboriginals call the native "Gum" tree (*E. tesselaris*) is a splendid honey producer, but the bees' nests are not those of the hive bee (*Apis mellifera*), but of the tiny native bee *Trigonum.* My friend says: the grass grew as high as the saddle flaps, the streams teemed with fish, honey was everywhere, and carpenter bees and mason bees, and occasionally a black fellow crept after him to launch a spear from the cover afforded by the rank growth of trees. The blacks like honey and refer to a wild bee-colony as "white pfellars sugar bag." We Australians are only just tickling the outside edges of our country. When we wake up and "get a move on" the United States won't have a monopoly of "The States." People will say, "do you mean the States of Australia?"

On the grassy plains of the Territory there are large herds of buffalo and "good money" is earned by those hunters who travel the vast areas to shoot the animals for their hides; the rest of the beast is permitted to decay; transport difficulties preclude the utilization of the other portions. Port Darwin is the sea port of the north and some very large meat works operate there, for the Territory is primarily a "meat" country. Apiculturally, the Territory remains a *terra incognita.*

A telegraph line stretches across the continent, and the linesmen who live in small groups many hundreds of miles from civilization, are always

on the lookout to welcome, or succor any travelers who should happen to pass that way. In case any of you readers undertake the journey—it must be done on horses, with a spare animal or two to carry the packs—their movements would be telegraphed ahead and a royal welcome extended to any travelers from the "outside."

The "Great Australian Desert," as the legend on the maps goes, is not a desert in the sense understood by the man in the street. There are great areas of "prickly spinifex" that can only be penetrated by certain tracks, but there is a "wet" or rainy season, when the great rivers rise and become navigable for many hundreds of miles.

In the closely settled portions of the commonwealth the beekeeper has to contend with the settler and the grazier who, in their efforts to secure more grass, "ring" the gum trees. That is, they cut a complete ring around the trunk which effectually prevents the tree from drawing any further nourishment below the "ring bark," for it is through the outer layers of fibre, etc., that the sap flows upward. This does not apply to the conifers, or pine trees, which draw up their sustenance from the center and increase by the formation of successive cylinders of primary and secondary bast.

In the "out back" areas there is little or no ringbarking.

Some Observations on Nosema-Disease

By G. F. White, Bureau of Entomology, Washington, D. C.

(Concluded from August)

Queens have been taken from Nosema-infected colonies and introduced into healthy ones, with the result that the colonies remained free from infection. Queens have been reared and mated in Nosema-infested colonies, and have recovered from the infection and remained healthy. It has also been seen that colonies show a marked tendency to recover from infection. Examinations have shown, furthermore, that in diseased colonies it is the exception, and by no means the rule, to find Nosema-infected queens. Fear, therefore, that queens are a fruitful source of infection in Nosema-disease, would be by no means justifiable.

Numerous observations strongly indicate that the disease is not likely to be transmitted by means of drifting bees or drones.

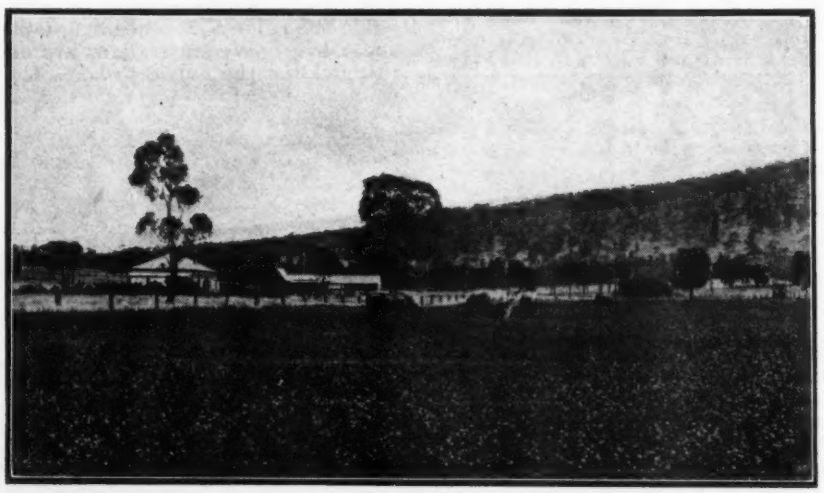
While it would seem that, under favorable circumstances, the disease might be transmitted by honey, the chances that this is done are much less, probably, than one would at first expect. Certainly, after 2, 3 or 4 months of spring, summer or fall temperature, the germs would be destroyed and no disease could result from such a source.

In most instances Nosema-infection does not spread rapidly from the infected bees of a colony to healthy ones of the same colony. This statement is supported by observations made on the disease, as it is encountered in nature, as well as in experimental colonies. During the studies made in 1912, on the apiary already referred to, Nosema-infection was found in all of the colonies, at one time or another, during the year, yet the percentage of infected bees in the apiary diminished from spring to fall. In experimental colonies, as has been said, the colony tends to recover from the infection. Were it true that the infection spreads rapidly from infected bees to the healthy ones of the same colony, the effect of the disease on the colony would be very different from what it is. Less is known concerning the transmission of the disease within a colony during the winter season. That the spread of the infection, within the colony, during this period, is not great in most instances, is evident.

Likely Source of Infection From Nosema

The watering place may be a likely source of infection. That bees void their excrements while on the wing and soon after leaving their hive, is certainly true for flights made during the warm days of winter and early spring. Beekeepers will know whether this is true for other seasons of the year. The excrement of Nosema-infected bees, falling into a body of water, contaminates it with germs and makes it a fruitful source of infection. This is true since the parasite remains alive for a considerable period in water. Should the body of water be a rapidly moving one, the chances for infection would be very much reduced. It will be readily seen also that the chances for infection would rapidly diminish as the distance of the water supply from the apiary increased.

"Wonga Wonga" vine. No, it is not a giant swarm of bees, but a vine indigenous to Australia. The photograph shows that it has almost covered a "rung" gumtree. The gumtrees are killed by a complete ring around the trunk, but a pine cannot be disposed of that way.



A typically Australian view. In the background, rising land timbered with native trees. In the foreground is a "flat" with a fine growth of lucerne. The buildings in the middle distance are the homestead, stables, etc. The picture was taken in New South Wales.

Robbing a Possible Source for Nosema-infection

Colonies which become weak, as a result of Nosema-disease, naturally are an easy prey to robbers. Definite observation to show that the robbing of hives, which have housed such colonies, results in infection, has not been made, however. Indeed, when frames from such colonies have been inserted into healthy colonies, the disease has not been transmitted to any appreciable extent. That robbing, in connection with Nosema-disease, is of less importance to the beekeeper than it is in connection with the brood diseases is evident. Until more has been determined, however, it is well for the practical beekeeper to consider robbing as one of the pos-

sible sources for the spread of the disorder.

Diagnosis of Nosema-disease

With very little experience beekeepers can diagnose Nosema-disease satisfactorily at the apiary. A weak colony, in the spring of the year, should be suspected. Since there are many conditions which cause colonies to become weak, a further examination is always necessary. This is done by catching and removing the stomachs of about 10 field bees of the colony, and noticing the appearance of these in a way which has already been described in this communication. Often fewer than 10 bees are sufficient, while sometimes it is desirable to examine a larger number. Fairly strong colonies may contain a considerable number of Nosema-infected bees. This occurs, however, less frequently than with weak colonies. Not uncommonly one may find a small percentage of diseased bees in colonies which otherwise appear entirely healthy.

The Chances of Recovery in Nosema-disease

As has been pointed out above, there is a strong tendency for a Nosema-infected colony to recover from the infection. Some colonies die, but fortunately the percentage is small. If more than one-half of the bees of a healthy colony, upon examination, are found to be Nosema-infected, the chances that the colony will recover from the disease are decidedly unfavorable; if practically all of them are diseased, the colony will surely die; if less than one-half of the bees are diseased, the progress is fair for recovery; if only a small percentage are diseased, death of the colony is not to be expected.

It seems probable, from the observations thus far made that the losses sustained from the death of colonies does not represent the major losses to the beekeeper in Nosema-disease. The weakness produced, in colonies that live, may be the larger factor, the colonies being weakened at a time when it is especially desired that they should be strong. In this respect the disease is more like sacbrood than the foulbroods.

Conclusions

If the beekeeper has gotten the view of Nosema-disease which the writer has attempted to convey by these discussions, he has gained the following impressions:

Nosema-disease is no new disease, but one which has been among bees for a very long time.

The disease may cause the death of colonies or may only weaken them.

Like sacbrood, it is very widely distributed.

It does not produce the heavy losses, in infected apiaries, which are common for the foulbroods. In this respect, also, the disorder is like sacbrood.

The losses resulting from Nosema-disease are greater than those from sacbrood. It is, therefore, a disease of considerable economic importance.

It is caused by a parasite (**Nosema apis**) which attacks the stomach of the adult bee.

Workers, queens and drones are susceptible to infection, the brood is not.

Blossom of the Buckeye, or Horse Chestnut

Outside the living bee, the germ dies in a rather brief period, and is quite susceptible to heat and other disinfectants.

Neither drones, queens, simple contact with infected bees, drifting bees, hives, bee supplies in general, nor flowers, are to be feared as fruitful sources of infection in the disease.

Diseased colonies possess a strong tendency to recover from the infection, without attention from the apiarist.

There is much yet to be learned about Nosema-disease. The facts which have already been determined, however, are sufficient to make it possible for the practical beekeeper to devise methods, for the treatment of the disease, which will be both efficient and economical.

Those who are interested in reading further of the studies that have been made on the disorder may find Bulletin 780, of the United States Department of Agriculture, of some interest.

The Buckeye or Horse-Chestnut

THE buckeye or horse-chestnut, (**Aesculus**) is widely distributed and well known because of the poisonous properties of the peculiar nut-like fruit, everywhere called buckeye. There are several species, with minor differences. The photograph is of the blossoms of the Ohio buckeye (**Aesculus glabra.**) This species occurs from New England west to Iowa, Kansas and Oklahoma, and south to Georgia, Alabama, and east Texas. There is a species common on the Pacific Coast, known as the California buckeye (**Aesculus californica.**)) This species is reported as yielding considerable honey in some localities in California and some beekeepers think it is poisonous to the bees.

The buckeye is widely mentioned as a honey-plant, though there are few localities where it is sufficiently abundant to be important as a source of surplus.—F. C. P.

Habits and American Foulbrood Treatment

By Arthur C. Miller

I WONDER just what makes men slaves to apparatus, why they use certain implements when they can do better without them? In "shaking" for the treatment of American foulbrood how often we find the first shaking made onto a full set of frames all nicely fitted out with foundation starters. And, oh how often, it is hard to change the operator from such practice and get him to use a simple box or a hive without frames, letting the bees build onto the cover such bits of comb as they will.

For the second shaking, full sheets of foundation should be used, with frames carefully wired, the wires stretched so tight that they will hum when struck, and for best results in rapid resumption of comb construction and brood rearing the foundation should be painted with melted wax (the Vogeler process).

In addition it is exceedingly good practice to give food to the colony after the second shaking and for this purpose candy or soft sugar is preferable to syrup. Most any of the soft, moist, cream-colored sugars work well in a division-board feeder. "Raw" sugar is even better when it can be procured. Candy suitable for the purpose is simply granulated sugar and water boiled until it will make a hard candy. A cupful of good honey to each ten pounds of sugar and boiled in improves it. Such candy is poured into shallow cake pans, filling them to one quarter of an inch from edge. Leave the candy in the pans and invert one or more on top of frames and the bees will lick away at under surface until it is all consumed. Leaving the candy in the pans prevents the absorption of moisture except where bees can lick it off and the candy stays firm and solid until consumed.

The food is always an advantage after shaking the second time, for the bees' sacs are empty, and if adverse weather condition arise the colony is not only saved from disaster but has a reserve store of food which maintains the work at a steady pressure.

The painting process not only prevents stretched foundation but it enables one to use very thin foundation. Standard brood foundation runs about 7 L sheets to the pound, and at present prices costs 10c per sheet, or $1 for ten frames. Light brood running 12 L sheets to the pound costs 7½c per sheet, or 75c for ten.

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THE EDITOR'S VIEWPOINT

Translations

Each nation considers itself the greatest on earth. **We** have won the war, even if the Italian, the English, the French and the Belgian,severally know positively that **they** have won it. It is thus in every pursuit. Each nation thinks itself just a little better than the rest, even in beekeeping.

But when we think of the past progress, we are compelled to acknowledge that, if we are the most practical beekeepers, we owe a great part of our success to the discoveries of other nations. Parthenogenesis was not discovered here, neither was the invention of the honey extractor, nor that of the comb-foundation. We must acknowledge that we need other countries and the information that they can impart. So translations of interesting subjects are imperative.

Some of our contemporaries publish clear translations of bee subjects and make use of them by comparing them with other contributions from different nations. In the present number we see L'Apicoltore bringing together statements from the American Bee Journal and from "Die Bienen" on the same subject. It makes interesting reading.

We are always proud to see quotations from our magazine in foreign publications, and this happens often. But some of our brother editors, in foreign countries, are not sufficiently strict in the selection of a translator. In our December, 1918, issue, there is an editorial which begins as follows: "We have been trying for several months to secure satisfactry information concerning the extent to which the bees work on the tobacco plant." A contemporary magazine translated the article and the above sentence was so distorted in the translation that, if we retranslate it into English, it reads as follows: "We have been criticized by several monthly reviews, concerning positive and satisfactory information in regard to the extent to which the bees work on the tobacco plant."

This is not the only instance in which incorrect translations have been made into foreign language from the American Bee Journal, and that is why we wish to call the attention of our foreign brother editors to the matter.

Off to Colorado

Our Associate Editor is spending some time with the beekeepers of Colorado. With note-book and camera he hopes to bring back some of the best of Colorado beekeeping for the pages of the Journal during the fall and winter months. Some of America's best beemen are to be found in the Rocky Mountain region and we believe they will have something worth while for him.

A Quarantine Law in Florida

The Florida Legislature has recently enacted a law placing the control of bee diseases under the State Plant Board in charge of Wilmon Newell. An appropriation of $10,000 has been provided to enforce its regulations. There is, as yet, but little foulbrood in the State of Florida, and an attempt will be made to prevent its being introduced from other States. Stringent regulations against the import of bees or equipment without a certificate of inspection have been adopted. Since the Plant Board has a large number of inspectors in all parts of Florida, it will be difficult for bees to enter that State by freight, mail or express without passing under the eye of one of these inspectors. Beekeepers who intend to ship bees to Florida should communicate with Mr. Newell at Gainsville to make sure they are able to comply with the regulations. Otherwise they may find themselves in serious difficulty. Few States have taken up the matter of disease control until it has become so widely spread as to be impossible of eradication. Since Florida is still comparatively free from it, we hope they will be successful in keeping it out. Mr. Newell is a thoroughly competent man and can be expected to act with the utmost good judgment.

Daily Field Trips of a Worker

The oldest Italian bee magazine, L'Apicoltore, gives every month quotations from bee literature. In its June number, we find a translation of our editorial on page 121, April, in which we quoted Mr. Demuth on the number of trips which a worker bee makes to the field in a day. The reader will remember that the average found by him was only 4 trips. We were astounded at so small a number and the Italian editor, in quoting us, remarks:

"The Signor Dadant had cause to be astonished and we are glad to report on this question the experience of a beekeeper, mentioned in July, 1914, by 'Die Bienen und ihre Zucht.'

"A beekeeper of Holstein made notes on this matter that are worthy of respect. He colored six workers with different colors and sat by the hive that contained them from 6 in the morning until 7 p. m., with a note book, a watch and a pencil. Each marked bee, as it went in or out, was made note of, in such fashion that by evening the tablet looked like a railroad time-table. He remained there the whole 13 hours, even taking his meals near the hive. The observations were continued the following day. The number and the duration of the trips corresponded with those of the first day.

As result of this experiment, the persevering observer stated that he now knows that bees make neither 40 trips, as reported by Zander, nor 25, according to Klaus, but only about 10. In addition, he ascertained that their flight lasted from a half hour to 2 hours, an average of an hour, and that the bees at each trip remained but a short time in the hive, between 5 and 10 minutes."

The Italian editor adds: "The evident result of variety of observations is that the number and duration of the flights are, and must be, varied, according to the extension of the bloom, the abundance of nectar secretion, which is exceedingly variable, and the distance to be traveled. An accurate study of this question may be of value to calculate the divers conveniences in the location of an apiary."

Winter Stores

It may seem a little early to talk of winter stores, in September. Yet this is the month when, in most of our Middle States, the bees store the surplus needed in the brood-chamber for the use of the bees, not only for winter, but for brood-rearing in spring.

The older we are, the better we realize that the bees are too often restricted, for stores, to an insufficient amount. In the production of extracted honey, especially when the supers are of easy access to the bees, they often fail to store a sufficient amount in the lower story to carry them through. Not so in comb-honey production. In the latter case, they always, or nearly always, crowd the brood-combs with honey, so that the queen may even be narrowed down to a few combs only for breeding. Both of these conditions are bad. If the breeding room is deficient, the amount of brood reared at the proper time to furnish a good cluster of young bees for winter will be inadequate. A small winter cluster in a hive full of honey is as bad as a larger cluster with insufficient food.

This is the month when we must investigate the conditions of the brood-nest. If too little honey is placed there, we find it quite beneficial to crowd the bees into a smaller number of supers, so that enough of the crop may be placed in the brood-nest, above the cluster, where it will be handiest. If two stories are used for winter, we may find the lower one so destitute of honey that it is of but little use, unless we follow the method of the Canadian leaders, who give the bees sugar syrup in order to get the brood-combs well filled. It is very important to attend to this matter before cold weather, or as soon as the crop shows signs of terminating.

How much is needed for good wintering and spring breeding conditions? Many of the treatises say 25 pounds. This amount may be sufficient, if the early flowers yield plentifully in spring. But if, as we see it often, the spring days are unfavorable, the above amount will prove inadequate. We prefer as large a winter store as 40 pounds, for a good, strong colony. If they have plenty they will not shirk their breeding and will give us better returns the following summer.

If the hive is crowded with too much honey, in early September, it will prove beneficial to remove one comb from the center of the brood-nest to allow the queen some laying room.

We need a good force of young bees for winter and a large amount of stores, close to the cluster.

Failures

We would caution our readers against ordering bees or queens from old advertisements unless they make sure that the parties are responsible. We have found it necessary to refuse the advertising of several who have failed to make good their agreements. We try to use every precaution to ascertain that our advertisers are responsible, but some who have furnished satisfactory references at the start have failed. As soon as we find an advertiser to be dishonest or unable to meet his obligations promptly we refuse his advertising. Some breeders have discontinued advertising because they already have more business than they can care for; others have been refused space. Orders from current advertisers are most likely to receive satisfactory service.

Honey Prices

There are too many producers who are unable to see that it is worth something to sell honey. The man who enquires the wholesale price and then proceeds to sell to his neighbors at about that figure is doing all within his power to ruin the market. The bottler must get enough above the price he must pay to cover the cost of freight, labor, containers, labels, advertising, rent, etc., and to provide a living beside. If he finds the producer is selling at retail at about what he must pay for honey his only recourse is to lower the price. If the producer meets this condition by again selling at retail at about wholesale prices the market again is depressed until ruin faces the business.

The cost of bottling and selling honey is heavy. Unless the producer is willing to sell his honey at retail at prices which will enable the bottler to live, he should sell his honey in a lump in the wholesale market.

The only hope for a prosperous industry lies in maintaining a sufficient margin between wholesale and retail prices to furnish an inducement for good men to make a business of developing the honey markets.

Mould as an Enemy of Adult Bees

In the present number our readers will find the translation of an article from an Italian magazine, upon the work of the Swedish scientist, Turesson, who is attempting to prove that the so-called May disease, of the adult bee, is due to a fungus of mould.

The reader will notice that the writer of the article in question makes light of the nosema, as a bee disease. We suggest that the trouble lies in believing that all the diseases of the adult bee may be condensed into one. Yet it is sufficiently proved that, among these diseases, paralysis, vertigo, Isle of Wight, constipation, some are more or less contagious, while others are light, of short duration and unimportant. It seems, also, to us, that when the stomach of bees is coated heavily with the nosema, of which examples have been shown in our July number, there must be a very positive diseased condition, and that Dr. White is right when he specifically describes that condition as "nosema disease."

But the Turesson experiments appeal to us. The so-called paralysis which we see constantly, in spring, in our Northern States, comes at a time when the weather is damp, chilly and favorable to the production of a musty condition within the hive. So, as long as our knowledge of the cause of these diseases amounts only to a number of interrogation points, let us not discard any suggestions until the arguments and the facts given are pumped dry. Experiments are valuable and valuable are the men who know how to properly conduct them.

Horticultural Complaints

It appears that in a town in Algeria, the City Council lately passed a resolution condemning beekeeping in the vicinity, because the bees deteriorate fruits through the removal of the honey from the blossoms. They hold that this affects the flavor of the fruits, and renders them tasteless. What next? (Nahhla).

SOLDIER BEEKEEPERS

By E. F. Phillips

SOMEWHERE there are statistics to show that a large proportion of the men engaged in the retail grocery business fail. Not being interested in the grocery business except as an ultimate consumer, I have not taken the trouble to verify this statement. However large the per cent of failures in the grocery business, it is fully as large in beekeeping, with one important difference. When a grocer fails he soon finds it out, but thousands of beekeepers are miserable failures and never do make the discovery. This is absolute proof, of course, that beekeeping is a branch of industry well worthy of effort, for if one can fail and still keep going it speaks well for the returns to be attained under the right management.

Because of the uncertainty of success one should hesitate about urging anyone to take up beekeeping. The uncertainty is not so much in the secretion of nectar, although, as every beekeeper knows, this varies more than we might wish. Yet we have all perhaps seen innumerable instances where the good beekeeper gets a crop when other beekeepers all about him experience a failure. The difference is really in the amount of brains applied to the business. Strangely enough, this does not always mean the amount of brains possessed by these persons, for many people do not fully apply to beekeeping the brains which they have. You cannot, therefore, tell in advance who will make the good beekeeper.

In spite of—or perhaps because of—a considerable amount of experience in answering questions of beginners and of trying to guide them through the early days of beekeeping work, I never try to help a beginner without a feeling that perhaps it is the wrong thing to give encouragement to a new beekeeper, who will, according to the law of averages, stand about one chance in a hundred of doing anything really worth while in beekeeping. But it is not my fault if they fail to apply themselves to this work, to study the literature, and especially to study their bees. If all teachers worried too much about the use to be made of the subjects taught, we probably would not have any schools, and all that any teacher can do is to do his best.

There is, however, another angle to the teaching of beekeeping, and that is the danger from the average small beekeeper. Apiary inspectors are almost unanimous in condemning amateur beekeepers and farmer beekeepers, making almost no exception to a universal condemnation, and anyone who tries to clean up an area of either brood disease will probably feel the same way. Commercial beekeepers, may their tribe increase, usually feel the same way about the beekeeper with a few colonies, partly because of the disease situation, partly because so many markets are temporarily injured by ignorant marketing of honey—and partly on general principles. The way of the amateur is a hard one, and yet probably every reader of this journal knows one or two, perhaps more, amateurs who are really better beekeepers than most commercial producers.

In this hasty and unsatisfactory manner I have tried to show why it is far from wise to do anything to increase the number of amateur beekeepers in the United States. We have already more beekeepers than we need—ten times over, perhaps. It is true that we need ten times the the present number of good beekeepers, but the wise policy at present is to make better beekeepers of those now in the work, rather than to try to make more beekeepers. This has been the policy of the Bureau of Entomology, and I hope it will continue to be so for many years.

There is one outstanding exception to this, however, and it is about this class of persons that I want to write. There are many men returning from France who have suffered some disablement, disqualifying them for the work in which they were engaged before entering the army.

Fig. 1. The first lesson in beekeeping. The hive-bodies were brought out for seats, but the men preferred the grass

Fig. 2. He thinks they are German bees.

While a commercial beekeeper needs to be in fine physical condition to do his best, it yet remains true that the most important part of a beekeeper is the part above the neck. If, therefore, there are some of these disabled men who can better find themselves in beekeeping than in other lines of work, if they manifest the right kind of interest and show a disposition to study the business, I, for one, shall be glad to see them take up the work, and shall be delighted to see them enter the ranks of commercial beekeepers. We owe these men a debt which we can never fully pay, but if we can make their lives better and happier by helping them get a start in commercial beekeeping, there should be nothing but the best of co-operation from the commercial beekeepers of the country.

The Government, through the Federal Board of Vocational Education, offers disabled men training in whatever lines of work they decide upon for re-education. If they choose beekeeping they may go to some school or college where a good course is offered, and every possible aid will be given them during the period of training. Unfortunately, not all the agricultural colleges offer good courses in beekeeping, but this important work is rapidly increasing.

Just as an experiment, the Bureau of Entomology recently invited some of the boys from the Walter Reed General Hospital in Washington out to the new Bee Culture Laboratory in Somerset, Maryland. They came

Fig. 4. Into a machine gun nest. Captain Deming, of the Reconstruction Division at the right

out in trucks and automobiles furnished by the Red Cross and were under the direction of the Reconstruction Division of the Army. On their arrival they were given a demonstration in handling bees, with a discussion of the life history of the colony and a brief talk on just what it is that the beekeeper has to do. At first they were given frames to handle from which the old bees had been removed, so that there would be no casualties. A few of the men who had been through gas attacks and barrage fire took to the bushes, but most of them stuck it out, and their courage increased as time went on and no fatalities occurred. Then they were taken to the apiary—without veils, because the supply which had been ordered had not arrived—and some honey was removed from the hives. A small extracting outfit had been set up out in the open and a few gallons of honey were extracted. A movie man came out for the occasion, and I think he tried to get a picture of that operation. If any real beekeeper ever sees that movie I trust that he will not think that we advocate the methods there shown, for it was difficult to uncap artistically with a few dozen hands ready to catch the cappings as they came off the knife.

Perhaps the most interesting part of the afternoon for the more timid men came after the honey was in a bucket, for the women of the local Red Cross unit then appeared with hot biscuits and coffee and we went back in the grove beside the house and re-stored that honey.

The accompanying illustrations give an idea of the good time and serve also to show something of the character of the new house and grounds used for the Bee Culture Laboratory and apiary. The date was May 27, and while there were some supers on the colonies more were added later. The bees were really ready for more then. Note the fine windbreak of the apiary and the arrangement of the colonies in groups of four for convenience in winter packing. And if the reader has any qualms about the making of too many beekeepers, or any selfish ideas about keeping the beekeeping business all to himself, please note the poor fellows with one leg. One man had his jaw shot to pieces and it is being rebuilt; several had a hand off and there were other injuries which do not show in the illustrations. Perhaps the question may be raised whether disabled men can handle bees successfully, but this has already been answered by those who in spite of such disablements have made a success of commercial beekeeping. Of course, most of our guests will not go in for beekeeping, but there are many more who were not with us on May 27.

Among the illustrations is one of the Bee Culture Laboratory at Somerset, Maryland (cover.) It needs no discussion to show that this is more comfortable than an office in the middle of Washington, and it is right by the bees. The office was moved here on February 1, and the bees were also moved at that time, which is somewhat unusual. However, the moving did not start brood-rearing, as was feared, for there is nothing worse for a colony than to have brood-rearing start out of season. It took careful moving to prevent this. After the moving only part of the colonies were re-packed, but the weather was so mild that no harm came to the unpacked colonies, and they are all busy storing honey.

Washington, D. C.

Fig. 3. The boys who had been "over the top" were not too sure of themselves among the bees

Cellar Wintering

THE following letter may prove interesting to many who practice cellar wintering. Although it is probably best to spend the most of our space in trying to tell beekeepers how to winter their bees, an occasional report of failure may prove beneficial. The writer of the following, received last May, prefers to keep the incognito, but we can vouch for his veracity:

"For many years I have had both a home and outyard of bees. The home cellar where the home bees are wintered, is under our dwelling house,

and has to receive some attention to keep the temperature right. The out-cellar has never really required any attention from the time the bees were put in until I took them out in spring; although I usually visited it once to three times. Both cellars had arrangements for ventilation.

Wanting to spend the winter in Tennessee, I put all my bees in this out-cellar, thinking they would be perfectly safe. My reason for doing this was that no one would be in my home, while I was away, to look after the home cellar. During the summer I had done some repairing at the out-cellar, and when I put the bees in, the ventilators were yet to be put in again.

At our State Convention Mr. —— a representative from the Bureau of Entomology, gave us a lecture, the principal part of it being that they had found a new and much better way of wintering bees than was generally known. He said it had been thoroughly tested and found to be far superior to any other method. He said if the temperature of cellar was 50 degrees, the bees were so quiet and comfortable and in such a dormant condition that they required very little oxygen and wintered very much better with all ventilators closed perfectly tight than if given air. I remembered that Doolittle said the same thing years ago. The cellar must be at that temperature when the bees were put in. I never until last fall had my cellar so warm as that, when the bees were put in, but it was this time. Heretofore my home cellar would always get up to that the latter part of March, and I would have to take them out early, for they got uneasy.

Being anxious to leave my bees in perfect condition while away, it appealed to me quite strongly. I had a talk with him about it and told him of my intended trip and how my cellars were, etc. He said to shut it up perfectly tight and all would be so good I would never give ventilation again. Then I talked with Prof. ——, who, though not a man of much experience with bees, said he was going to winter our State University bees that way, and said he knew that was the proper way to do. Being in a hurry to get off to the South, and as this would save me a day's work from putting in ventilators, I yielded my judgment and experience to theirs and "bottled my bees up tight" and made for the Southland.

The outside temperature has never materially affected that cellar, and I have had that many hives in it before. The temperature was just 50 degrees.

We had our cold week just after January 1, which was the coldest spell we had this winter. Immediately after I left, the 13th, it warmed up and was warm all the while I was gone, but I cannot see why this should have affected the cellar much, being three feet under the ground. There is three feet of earth over the top. It is true we had the warmest winter we ever had, and possibly it made some difference.

The first week in February I wrote to a man to go in the cellar and report conditions to me. He wrote the bees were several inches thick on the cellar bottom. I went home from Nashville as quickly as possible, which was about the middle of February. I never saw such a sight and hope to never again. It seemed the bees could smell a little air coming in around the door and had deserted their hives and gone towards the door until the hives nearest it had bees four to six inches thick on the fronts, and many hives farther back had not a bee in them, and the cellar registered 62. I shoveled up about eight bushels of dead bees and opened the ventilators and the cellar cooled down to normal, and after that but few bees left their hives. As a result, the hives that had any bees in when I removed them from the cellar had from a cupful to a pint, or a little more, to a hive. The weather has been extremely hard on even strong colonies, and at present I have, from 109 fine colonies last fall, probably 20 to 25 three-frame colonies to start beekeeping with again.

I cannot say what the result would have been if there had been cold weather instead of warm, but this I know, I shall let well enough alone hereafter and experiment on a smaller scale. Had I been at home and wintered as usual I am positive my bees would be in fine shape now.

It is impossible for me to have any clover honey this year and I can only run for increase and get my number as far as possible by fall.

Prof. —— wrote me that most of the University bees were gone with dysentery. I wonder if it was that or want of air."

Fig. 5. "Chow" back in the grove, served by Red Cross

Large Hives Again

YOUR large brood-chamber propaganda is attracting considerable attention in this State and I find a number putting in a few Jumbo hives this year for a test.

In discussing this large brood-chamber matter with President Barclay, he said he understood that if you were starting anew you would use the Jumbo depth Hoffman frame. I did not get this from your talks. Is it true?

E. G. CARR, New Jersey.

You are both right. I do not think that I would take the Jumbo hive for my standard, if I took in consideration nothing but my own system.

But, in consideration of the existence of the Langstroth hive length all over the United States, I did say that if we were to begin over again, we would use the standard length of the Langstroth hive, with the depth of ours, which is the Jumbo size of frame.

However, I want it made very clear that I do not at all relish the spacing of the standard frames and of the Jumbo, i. e., the 1⅜-inch spacing. Never did I realize better than I have done for the past two years that the 1½-inch spacing is very superior to the narrower. I said and wrote, and am willing to repeat to as many as will listen, that the 1⅜ spacing is a promoter of natural swarming. This idea is not my own originally, it was emitted by Allen Latham, but it struck me as evidently true, because we had for years used the wide spacing and had been successful in avoiding swarming, without thinking of the influence of it upon that feature of bee behavior, while others who tried our method, but with the narrow spacing in their hives, found the method inadequate. I secured these ideas concerning the wide spacing, from Mr. Latham immediately after attending your New Jersey meetings, in 1916.

The wide spacing allows ⅛ inch additional space between each comb through the height and length of the hive. This space, ten times repeated, between each of the ten frames makes a space of ten-eighths, or 1¼ inches, which multiplied by the length and the depth, give us something like 170 cubic inches of additional space, breathing space and ventilating space, when the hive is full of brood and bees. When the hive is filling with honey, it adds several pounds of honey above the brood, just where it ought to be, because the bees do not need all the space to travel through and therefore narrow it down by lengthening

the cells. But when the breeding season comes again, those cells are shortened to the proper length for breeding, and that is when the bees need the ventilation and the room. In winter more bees cluster, between the combs, under the honey than in the narrow spaces, and the wintering is better. No one has yet been able to overthrow this position.

This discussion of large brood-chambers has been practically forced upon us, by enquirers, and has been especially urged by Frank C. Pellett, who became enthusiastic over our methods when he joined the staff of the American Bee Journal.—C. P.Dadant.

Do Ordinary Cryptogams Cause May Disease, Wing Paralysis and Trembling of Bees?

THE knowledge concerning the diseases of adult bees is at present very precarious, said Dr. Morgenthaler, a member of the Bacteriological Institute of the Liebefeld, near Berne, and since the causes are not positively known, their diverse forms are not easily distinguished from one another. It is not known whether the ordinary symptoms—swollen abdomen, inability to fly, trembling and darkening of color, which appear isolated or combined—belong to one and the same disease. The discovery of parasites made by Zander has not yet supplied the expected explanation.

The great interest which all beekeepers take upon this question of mortality of bees, in large numbers, sometimes causing complete destruction, justifies the analysis of the work of Turesson.

This Swedish author, in experiments made in 1916, examined the toxic action of cryptogams upon man and mammiferous animals. He found that certain fungi which are very common may exercise a poisonous action, more or less powerful, upon the organs. In rabbits, fed with cultures of different cryptogams, he noted the following symptoms: At first, irritation of the nervous system, which manifested itself with trembling and spasms, a greater cardiac activity; then a weakness to such an extent that they could not stand upon their legs; finally paralysis and death. Paralysis attacked also the digestive tube, in such mode that the intestines could not discharge anything, and a constipation was produced which caused a great dilation of the stomach and of the rectum. Turesson thinks that too little attention has been paid in the past to the toxic influence of cryptogams and that, for example, some of them cause cerebro-spinal meningitis of domestic animals.

Their toxic action is due to the fact that these fungi produce substances related to phenic acid and have much analogy with the acids of lichens, which are also poisonous for various animals. The resemblance of the morbid symptoms described, with those often observed in the diseases of adult bees, induced Turesson to examine more closely the influence of nutrition with the fungi of mould. He enclosed about a dozen bees in each of 13 cages sufficiently roomy and fed the ones with honey mixed with a determined amount of various fungus of mould; the others, to serve as checks, with pure honey. The result was that one species of fungus, after 3 days, the others after 4 and until 8 days, had killed them all, while those fed with pure honey were still in good condition. The dying or dead bees had nearly all a swollen abdomen, caused by a plethora of the stomach or intestine; presenting therefore the symptoms of the May disease; only with the fungus that had caused death in 3 days did the bees appear to have a normal, non-tumefied abdomen, because in that case the venom had acted too speedily and the bees had died before having absorbed a large amount of food. The other symptoms of the malady were as follows: Paralysis of the wings, unsteady walking and trembling. The bees often rubbed their abdomen with their legs and thus acquired the shiny black color.

Five different fungi were employed in the tests; 3 species of the genus **penicillium,** the ordinary **mucor mucedo,** and the **cladosporium herbarum,** a frequent fungus which belongs to the black fungi, and had been produced in part on dead bees and in part on combs of honey. It is probable that other kinds may be found of varying toxicity and even more poisonous; the different species are of variable toxicity and it is even possible that some subdivisions of the same species may behave in different modes, and that a fungus may be fairly lenitive in one region, while the same variety becomes virulent in another, by a greater production of poison. Thus, according to Turesson, the question is not, in regard to the mortality of bees, of a properly called infection, or of parasites the germs of which develop in the body of the individual bee, but of an intoxication by means of a chemical poison. In such a case the poison does not remain within the fungus, but is transmitted to the body upon which it acts.

It is therefore possible that even sweetened water in mouldy combs be poisonous, even after the fungi have been removed. The toxic substance is not destroyed by the heat that may melt combs. The fungus of mould does not develop on virgin combs; on the other hand, every beekeeper knows that a mode of production of mould are the used combs, which are sometimes kept in an ill-ventilated closet.

The moist heat which predominates within the colony is favorable to the development of fungi. The bees must certainly use great cleanliness to avoid mould in their home and they need also ample ventilation of the hive, in summer and winter. The fall feeding with sweetened water should not be provided too late, because at that time the food cannot be sufficiently condensed, from which an increase of moisture is produced. The combs hanging in winter outside of the cluster are especially exposed to the possibility of moulding. This is one of the reasons why the symptoms of poisoning are more particularly and more frequently manifested in spring, when the bees begin to use the food in those combs, or even if they only polish them with their tongues.

This is, in brief, the summary of the work of Turesson, who believes he has discovered in the fungus of mould the cause of the May disease, of paralysis of the wings and of the trembling. Although mould has been considered bad and noxious by beekeepers, this work exposes some viewpoints that are quite new, to judge of its influence upon the mortality of bees in large numbers. The future will demonstrate whether his opinion is just, or whether, as with the nosema, the toxic influence of the mould is not too much dwelt upon. The experiments made with bees in cages are not sufficient to elucidate the matter; it is necessary that the experiment should pass through the observing of the apiarist. The imprisoned bees find themselves in abnormal conditions and the evidences upon the perturbations of digestion should be judged with increased care. In fact, a normal bee, aside from her love of cleanliness, will avoid discharging her excrements in the hive, or, in this case, in the cage; this alone is already sufficient to disturb the digestive functions from their natural process. It is true, on the other hand, that the checks made, by feeding some imprisoned bees with pure honey, who remained healthy, bespeak in favor of the Turesson opinion.

It would be most important, I believe for beekeeping, if it was confirmed that the mortality, in large numbers, of the bees, be by intoxication and not by infection produced by bacteria or by nosema; this especially in my opinion as regards the cure. In the apiarian publications are found frequent reports of favorable results obtained with curing liquid remedies. The British Bee Journal interests itself exhaustively in this question. Each number of the past year contains one or more articles giving proofs, whether successful or not, of cure of the Isle of Wight disease, which yet remains unexplained and is very disastrous. The results were lately so favorable that their Department of Agriculture took interest in the matter and offered a remedy that was recommended, Bacterol. Since the nosema was for a long time considered as cause of the disease, one could reasonably doubt the efficacy as cure of a chemical substance, since these spores are much more resistent, against such an influence, than the intestines of the bee; it would seem rather strange that a remedy might destroy those spores without being noxious to the bees in any way. Lately, it has been demonstrated, by Anderson and Rennie, that the Isle of Wight disease has nothing to do with the nosema.

In some other countries, also, the wholesale mortality of bees has been charged to the nosema, of which it is difficult to give an explanation, because this parasite is not always present in the dead bees. On the other hand, its propagation in healthy swarms has damaged its fame as a dangerous germ. I do not believe that the nosema deserves the interest of those who occupy themselves with bee diseases.

If it becomes established that the cause of the disease is not a resistent micro-organism, but a definite chemical substance, similar to phenic acid, there will be, already, a great possibility of obtaining, at least in light cases, an improvement and a cure through an antidote administered under shape of liquid remedy. The work of Turesson opens, therefore, a favorable field for observation and experiment.

However, the best prophylaxis, against diseases, must not be sought, in one case or the other, among chemical substances, but in a well-managed hygiene of the bee hive, making it a salubrious home for the bee, by rational management.

(Translated from L'Apicoltore Moderno, of Turin, May, 1919.)

Boys and Bees

IN all my experience of high school teaching, I have never found a more ideal combination of work and play than in my course in Bee Culture, which I am conducting in the Montezuma Mountain School since the summer of 1918.

The enthusiasm and thoroughness with which my students work in the shop and laboratory, as well as around the bees, is evidence enough that such a course is a desirable feature in high schools of the Montezuma type. Such a course can easily be made a subject of highly scientific merit as well as of practical value, as it keeps our boys busy and interested all the time and brings them closer to nature by our frequent afternoon excursions to my different outapiaries, which are located in the neighborhood of the school.

WILL C. STEINBRUNN,
Los Gatos, Calif.

Introduction of Virgin Queen

By Elvin M. Cole

IN Dr. Miller's Answers, page 19, of the May Journal, "Wisconsin" asks what to do with pollen-clogged combs.

I suggest this plan: With the end of a knife or hive tool, scrape the pollen-filled part of the comb down nearly to the mid rib on both sides if necessary. With combs that are slightly brittle there is little danger of making a hole in the mid rib, and both sides can be scraped in about a minute. Give them back to the bees during a honey-flow.

Tough, leathery old combs may be easily cleaned on one side in the same way, but it requires care when cleaning the opposite side; however, most combs will be badly loaded with pollen on one side only.

After starting tough combs with the knife, the cells may be peeled from the base with the fingers.

I have had but little experience in introducing virgin queens as discussed by Dr. Miller, page 17, January, and Wm. Atchley, page 170, May, American Bee Journal. But G. M. Doolittle goes quite deeply into the subject in Scientific Queen-rearing, and gives the law that governs the action of bees toward a virgin queen. It is in scattered paragraphs on several pages and two chapters, and requires careful reading to get it.

The "basic law" is the same as in Mr. Atchley's plan, and the plan used by Mr. Alexander for introducing two or more queens to a colony. I believe it is the only method of introduction which Mr. Doolittle claimed to have originated. He shook bees into a box and left them for 3 or 4 hours, or until they realized that they were hopelessly queenless, then dropped in a virgin queen of any age. In hiving them in the nucleus box, he says, page 61: "Do not give them any unsealed brood, for if you do they will sometimes kill the queen and rear cells from the brood given. It is not natural for a colony to have an oldish virgin queen when they have eggs and larvæ, for in nature all brood would be sealed before the young queens were three days old."

In introducing to a nucleus from which a laying queen had just been taken, he took away all brood and gave her a cage which allowed the bees to release her in 8 to 12 hours, by which time they would realize they were hopelessly queenless without her.

On page 87 Doolittle says: "For in nothing are bees so determined as they are not to accept a virgin 5 or more days old after having their mother taken from them. I have never lost a queen in this way, no matter if she were 12 days old when placed in the cage, and I consider it an absolutely safe plan for introducing a virgin queen."

Mr. Doolittle considered this plan of introducing laying queens to hopelessly queenless bees to be infallible, and says, page 80: "I have used this plan with all valuable queens for several years, and have not lost a single queen, nor do I believe that I ever shall lose one."

It would be a great help to young beekeepers if you would "lift out" the different paragraphs giving this "hopelessly queenless" method of introduction and print them in consecutive order.

I consider Scientific Queen-rearing the most interesting and helpful bee book I ever read, and I have read most of the modern ones, even though I never expected to rear a queen by that method.

About every so often you may count on seeing some of Mr. Doolittle's ideas yanked out of this book, a few unnecessary frills added, and given to the beekeeping world as something new; as witness: Alexander's plan for introducing plural queens (which is this hopelessly queenless method), A. C. Miller's smoke method, Baldwin's dipping the queen in honey, Atchley's introduction of virgin queens, etc. Verily great was G. M. Doolittle.

Audubon, Iowa.

A students' apiary at Montezuma Mountain School, under Prof. Will C. Steinbrunn, at Los Gatos, Calif.

A Little Pioneer History

A WAR song, famous in its day in Marion County, has been revived and will be sung in the celebration of the 100th anniversary of Marion County's birth, in Palmyra this month by the sons and daughters of soldiers who left Palmyra in 1839 to begin the first civil war in the west between Missourians and Iowans. It was called the "Honey

War." The dispute, which was over a 12-mile-wide tract of wild timber land, foreshadowed the mighty conflict that two decades later hurled Missouri and Iowa men, tiger-like at each other's throats.

In the disputed territory were many bee trees. This gave its name, the "Honey War," for both the pioneers in Iowa and Missouri adjacent to the strip coveted the privilege of cutting the bee trees and securing a supply of "sweetnin." Men of a later age, who find sugar in every store, may not be able to understand the fight for the wild honey, the only source of sugar then for household use.

Foreshadowed Civil War

Despite its title and absurd ending, deeper reasons led Governor Lilburn W. Boggs, of Missouri and Governor Lucas, of Iowa Territory, to call out the militia of State and Territory to march to repel invasion. "Black Ivory," not golden honey, was the real issue. Some pioneers in the section held slaves, who would be freed if Iowa gained possession of the strip. Their fellow-slave owners in Missouri were in full sympathy with their desire.

In August the sheriff of Clark County, was taken prisoner by Iowa militia when he was tax collecting in the disputed strip. This stimulated the war spirit, and in November Governor Boggs, of Missouri, called out the State militia. Gen. David Willock, commanding the 14th Militia District, a Palmyra man, and Gen. O. H. Allen, of Lewis County, were ordered to take the field. Col. John Lear, of the 56th Regiment, M. S. G., and Capt. Thomas P. Stewart, of Palmyra, called for volunteers to augment the regular forces, and as the drum beat, the long roll Palmyra men with rifles and horses responded. Soon 2,200 militia and volunteers were on the march for Iowa, with more than 50 men from Palmyra. In the same spirit the Iowa "free soldiers" rushed to arms and moved out to hold the debated ground.

Off to Waterloo

December 12 the Marion County men started for Waterloo—ominous name—in Clark County. The first night was one of torture. Assailed by rain and snow, without camp equipment and supply wagons on Upper North River, huge log fires alone saved the men from freezing. Another day's march in the slush roads and icy winds brought them to another camp as bleak and forlorn as the first stop.

In this camp, on the Troublesome Creek, the peace messengers came. Col. Thomas L. Anderson, F. H. Edmonson and S. M. Grant, Missouri diplomats, met William Patterson, Dr. J. D. Payne and L. B. Hughes of Iowa in Waterloo and reached an agreement for the armistice. The commissioners decided to appeal to the United States Government to decide the sovereignty of the honey lands.

Governors "Labeled and Shot"

Disgusted with the tame ending to their plans for martial glory, the Marion County men opened up a barrel of whisky, hung two haunches of venison to trees labeled Governor Boggs and Governor Lucas and filled them with the bullets that they had planned to use in winning the Honey War. When they marched back to Palmyra many of the men turned their coats inside out and all sang the rollicking lines of the Honey War song.

Lewis County men were harder to appease. A convention was held in Monticello and fire-eating orators denounced the commissioners, the governors and everyone else who had prevented a civil war. A year later the United States awarded the honey lands to Iowa, and it is noteworthy to recall that this award was made on the recommendation of a Capt. Robert E. Lee, who made the survey in 1837, and who, 25 years later, was to win immortal glory when he led the Missourians in another and far bloodier civil war.

The Honey War Song

The Honey War was ridiculed in a poem written by a Palmyra rhymster, and it was sung in disgust by the troops who returned from the bloodless war. The poem follows:

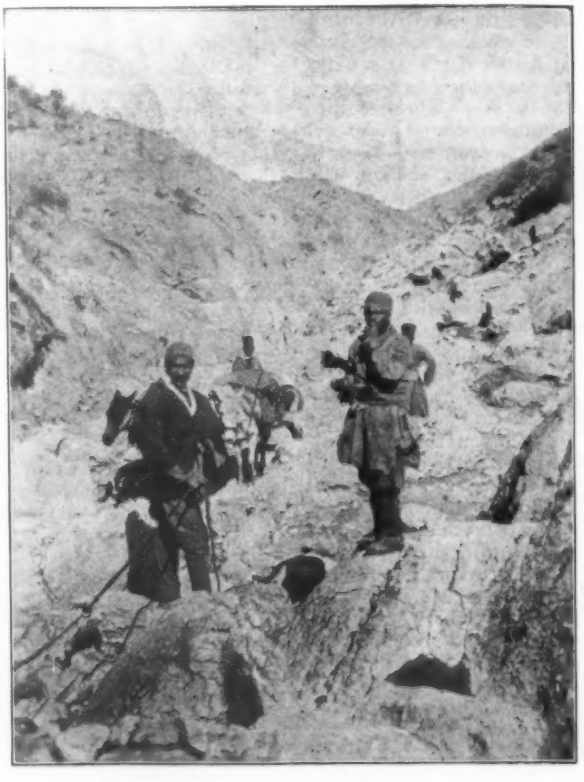
Ye freemen of a happy land,
Arise! To arms! Your ponies mount!
* * * *
Regard not blood or money,
Conventions, boys, now let us hold;
Our honey trade demands it.
Likewise three bits, all in gold;
We all must understand it.

Now, if the governors want to fight,
Just let them meet in person.
And when noble Boggs old Lucas flogs,
'Twill teach the scamps a lesson.
Now let the victor cut the trees
And have three bits in money,
And wear a crown from town to town
Anointed with pure honey.
* * * *
Our honey trade will then be laid
Upon a solid basis.
And Governor Boggs, wher'er he jogs
Will meet with smiling faces.

—St. Louis Republic.

Benton's Travels

EARLY in 1880, Frank Benton went abroad, where eleven eventful years were spent in travel and study, and in investigating the honeybees of Europe, Asia and Africa. Apiaries were established on the Island of Cyprus and in the Holy Lands at Beirut, Syria. In the winter of 1880-81 Ceylon, India, Farther India and Java were visited and extensive collections and studies were made of the native bees of those regions. It was on this expedition that the "jungle fever" was contracted, which ultimately claimed its own, but only after many years of active service had intervened. The winter of 1882-3 found Dr. Benton a student at the University of Athens, and the years 1884-86 were spent at the University of Munich, where he all but completed his work for the doctorate. He was granted the Master of Science degree by the Michigan Agricultural College in 1885 in view of his studies abroad; and some years later the degree of Sc. D. was conferred upon him by the Oriental University of America for similar studies. During the years spent in Munich several trips were made to Cyprus and Syria, and on one occasion Tunis and the African coast were visited and the bees of these regions studied. Italy was visited by



Benton caravan crossing Persia, in 1906

the way as was also the little province of Carniola, in southern Austria, with the result that the four years from 1886-90 were spent in the fastnesses of the Carnic Alps in investigating, breeding and giving to the world the docile bees native to these mountains.

In 1890 Dr. Benton was commissioned by Dr. C. V. Riley, the United States Entomologist at Washington, to proceed to the Orient for the purpose of carrying on further investigations of the giant bees of India, and to study and import the Blastophaga wasp from Smyrna in the interest of establishing the Smyrna fig industry in California. Unfortunately, this commission passed Dr. Benton on the high seas, as he had already sailed from Hamburg for New York in December of 1890, after an absence from his native land of eleven years.

On his arrival in America Dr. Benton was offered a chair in modern languages at Cornell University, and at the same time came an offer from the United States Government to go into scientific work at Washington. It was not an easy matter to decide, especially for one so rarely gifted in both fields of endeavor. But at the parting of the ways Dr. Benton, at the age of 39 years elected to go into scientific work, thereafter becoming only indirectly identified with academic life as an occasional lecturer. He proceeded to Washington in July, 1891, the proposed trip of exploration abroad being held in abeyance for the time being, and fourteen years intervened before this second journey was finally undertaken.

It was not until June, 1905, that Dr. Benton finally undertook his second tour of apicultural and botanical exploration which became a world embracing expedition, and everywhere he was welcomed and given the highest attention and every consideration by both scientific workers and members of apicultural societies and of the apicultural press. One leading periodical in summarizing his work closed with the statement, "Happy America that can speed **such** a man on **such** a journey!"—an index of his appreciative reception abroad. The overland route through the Balkans to Constantinople was followed and from thence the Caucasus was visited, where, in spite of the Russian revolution of that year, much data of value was collected, and representatives of the Caucasian races of bees imported. During the height of the revolution the Bishop of Armenia extended to Dr. Benton the hospitality of his monastery at Erivan, where Dr. Benton took refuge for several weeks until able to proceed to Baku on the Caspian Sea, from which point the long journey inland through Asia was started. Turkestan and Bokhara were visited, from where was imported the Turkestan melon, now becoming extensively grown in this country as a table delicacy. Turning southward, Dr. Benton organized a caravan, traveling a thousand miles through Persia, reaching Teheran early in January, 1906, and India the fore part of March. During the

Frank Benton

next seven months every part of India was visited, from Quetta in the northwest to the jungles of Assam, from the plains of Jubbulpore to the Himalayas of Simla and Darjeeling, and extensive studies made of the native honeybees which were captured and kept under observation in experimental hives. The guest of His Highness, the Maharaja of Kashmir, Dr. Benton had placed at his disposal a herd of elephants and retainers which greatly facilitated the work of exploration that he was engaged in. Finally, in September, the Philippines were reached and several months were spent in a long tour of this thousand-mile archipelago. At Zamboango, in Mindanao, Dr. Benton was very ill with fever contracted in the jungles of Assam, but despite these difficulties he was able to rally and continue his work of investigation. The homeward journey was made by way of the Chinese coast, and some time was spent in Japan, Dr. Benton reaching America early in 1907, after an absence of nearly two years, with his long-planned journey an accomplished fact.

The Barbeau Queen-Rearing System

WE have received a number of enquiries concerning the above system, described in the July number. Although we have not tried it ourselves, owing to lack of time, we are informed that it is quite successful, and the fact that Mr. Barbeau offers it free to the public should not deter beekeepers from the appreciation of it. Replying to our enquiries, Mr. Barbeau sent us the following letter from one of his pupils, who owns several large apiaries. This we translate from the French:

"I am glad to be able to say to you, in answer to your request, that I have well succeeded with your method of producing queen-cells. I raised 700 queens the past summer and obtained 90 per cent of queens from the cells which I produced. With the old method I succeeded in only 35 to 50 per cent of the cases. Your method is better, for it gives less labor and secures more queens.

"The best way to succeed is to have plenty of young bees in the colonies that rear the queens. For that purpose I give the orphan colony some combs of brood ready to hatch.

"To rear queens in time of dearth, it is necessary to feed the queenless hive two days before giving it the queen-cells and continue to feed it for 6 days afterwards, provided it is strong enough."

Yours truly,
O. FONTAINE,
St. Guillaume D'Upton, Q.

The advice to keep the queen-breeding colonies fully supplied with young bees, and fresh food in plenty, is also strongly recommended by Mr. Barbeau and this advice tallies with the experience of all queen-breeders as well as with the recommendations of the writers of all the practical works on bees.

Mr. Barbeau describes 3 methods of queen-rearing by his system, as follows:

First Method. Remove the queen from a strong colony, and allow the bees to rear queen-cells in the natural way. But after 7 or 8 days, remove all the queen-cells, whether finished or just begun. At the same time, shake or brush into the hive, after having smoked it, the bees of 2 or 3 frames from another colony Be sure to locate the queen of each colony so as not to remove her.

Better still, if you happen to have a small swarm, would be to unite it with the queenless colony. The aim, in all this, is to have a large number of young bees to feed the royal larvæ.

Three or four hours after having prepared the colony as above stated, cut out, with the punch, such larvæ as you may wish to use from your best selected colony. Let them be larvæ about a day old, of the size of a lettuce seed. After having removed as many as you desire, 20 or 30, or more, insert them into the cupules and screw these cupules into a brood comb of the queenless colony. At the end of 10 to 11 days, the queens will hatch.

The above method is a little slow, but it is very sure, especially for beginners.

Second method. This consists in removing from the hive the queen and all the combs of unsealed brood. Leave in the hive only 2 combs of entirely sealed brood almost ready to hatch. Add to these also some combs of honey and, if you wish, another comb or two of entirely sealed brood and young bees from other hives. Always be particular to locate the queens of each hive so as not to give them by error to the queenless colony.

Prepare your queen-cells as before and insert them into a dry comb, which you then place in the center of the queenless hive. This comb should be placed into the breeding hive only 3 or 4 hours after having prepared the colony.

Third method. This consists in placing a queen-excluder between the

brood-chamber and the upper story of a very strong colony. For this purpose it is necessary that the colony should fill its brood-chamber and super with bees. If you do not have any colony strong enough for that you must add bees to it a few days previously. Of course the old bees united to it will go back to their home, but the young bees will remain and it is the young bees that are needed to feed the larvæ.

If your colony is of sufficient strength, give it, in the super, two combs of sealed brood, between which you place your comb of cupules.

Should the bees of this colony refuse to build queen-cells out of the cupules, which is a rare occurrence if the colony is strong enough, you can compel them to build the royal cells by removing this super and placing it on the stand of the main brood-chamber, setting the main brood-chamber right by the side of it, but with its entrance at the opposite side, in the rear instead of the front. This operation should be performed early in the morning. The next day you place both hive and super back to their original position, with the super above the main brood-chamber. You will then find that nearly all the cupules are being worked upon. This method is rarely needed to compel the workers to construct queen-cells. It requires a little more experience than the first two methods described above.

To prepare a comb of cupules, take from the colony containing your choice queen, a comb containing larvæ a day old. Carry it away from the apiary to a convenient spot. Then, with the punch, cut out as many cells as you need and place them into the cupules with the "pusher." Then get a comb from your breeding colony and screw the cupules into it. It may then be put back in the center of the hive as stated above.

At the end of 8 days, when the cells are sealed, and the queens getting ready to hatch, build up nuclei, or make divisions, or remove your old queens and enclose your queen-cells in royal cages, so that when they hatch they remain prisoners. Within 2 or 3 days you may release them to be fertilized.

You may introduce a hatching queen in this way in a colony having a young queen ready to be fertilized. Just as soon as she begins to lay, you may remove her and release the other at the same operation. You simply take off the cover of the cage and the bees consume the candy and release the queen. By alternating in this way, you may secure laying queens very rapidly.

E. BARBEAU,

St. Eustache, Quebec.

Introducing Queens

I HAVE no luck introducing queens; have tried every plan I have read of, smoke, syrup, etc., but they kill them; throw them out every time; have removed the old queen and destroyed cells. How long can a queen be kept alive caged, and is it necessary to keep bees in cage with her? The candy melts and drowns them for me in hot weather.

Missouri.

Try the following for the introduction of queens:

Have one of the little flat Miller queen cages that are sold for 10 cents. When you receive your queen or have a queen ready for introduction, remove the queen which you wish to destroy and place her in the cage. Put the cage between two combs in the center of the hive near the brood. After 2 to 4 hours take the old queen out of the cage, kill her and put your new queen, without any of her workers, in that same cage, in the same spot between combs of brood. After 48 hours, release her by placing a chunk of comb honey in place of the stopper of the cage. Close the hive and do not disturb it for at least 2 days. This method succeeds with people who cannot succeed with any of the other methods.

The idea of caging the old queen for a few hours in the cage intended for the new queen is to give the bees the suggestion that their queen is in that cage.

Never kill a queen ahead of time, when you wish to introduce a new one. Better not let the bees know they are queenless for a single hour.

A queen will live a number of days in a cage, alone, if in the middle of the brood-comb.—C. P. D.

Helping make the Kansas prairies produce. Apiary of A. V. Small, at Augusta

One-Story Jumbo or Two-Story L. Hives

By Arthur C. Miller

IT was recently my good fortune to examine several score of colonies which were kept on two Langstroth bodies as permanent brood-chambers, and the conditions were not pleasing from an economic standpoint. With scarcely an exception, all the brood was in the upper chamber and the lower chamber contained nothing but empty combs. Some of the colonies had swarmed and others were preparing to. To make matters worse, the combs of the lower body were often badly gnawed. Here was a direct waste of nearly half the equipment, a matter which cannot be lightly passed over in these times of high prices.

When these colonies were prepared for winter last season the brood-nest had been in the lower story and the upper story was fairly full of stores. This spring the owners had simply put on the supers and let the brood-chambers alone, after assuring themselves that the colonies had queens and were prosperous. The few cases where brood was also in the lower story were where the upper set of combs were still pretty full of stores, far too much for profit.

Advocates of the two-story plan will doubtless retort that the owners should have transposed the position of the two bodies or have shifted more or less of the brood to the lower stories. But the owners object to "manipulation" as being too costly. In most of the yards examined there were also Jumbo hives, and these were proving so much more satisfactory that the owners are, as fast as possible, shifting to that style of hive.

In a nutshell, the two-story Langstroth, as a brood-nest, is too big, and not only costs nearly twice as much but is of the wrong proportion and necessitates the handling of twice as many frames when a colony has to be gone through. Theoretically, the bees should not behave so; they should extend the brood-nest downward, because the text books say so. Naughty bees to put such a crimp in the sale of the two-story brood-nests.

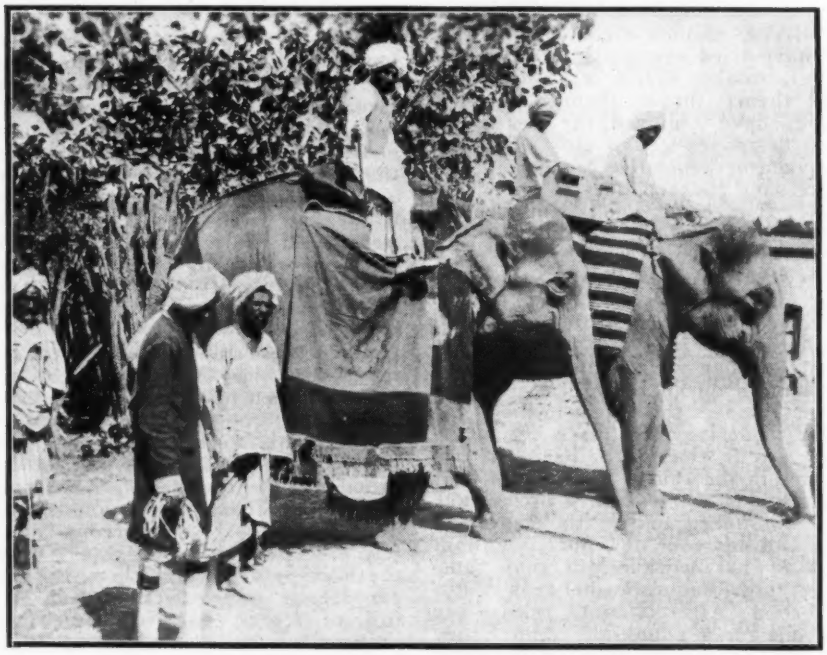
Moses Quinby, the Wise, studied bee behavior and experimented on hive sizes and proportions perhaps more fully than anyone else has, and he finally settled on a hive that has proven itself to be right. The Jum-

bo is, for all practical purposes, the same as the Quinby. It is of the same depth, but about seven-eighths of an inch shorter, but has the advantage of taking all the equipment of the 10-frame Langstroth hive except the frames. Mr. Draper, the introducer of the Jumbo, then known as the "Draper Barns," builded better than he knew when he put the Quinby depth on the Langstroth length. If our supply men would only be as considerate when making innovations we would all be better off and happier. Incidentally the supply men would be less troubled with orders for "special" goods, when often those specials are merely an attempt on the part of the purchaser to get duplication of what he had before, which was "stock" stuff when he got it. I sometimes wish I could get the factory man out on an inspection trip with me and let him see what awful misfits some of the factories "made to fits" are.

Apparently the beekeeping world is shifting to Quinby size hives and the supply men will advance their own interests as well as ours if they will get together and agree upon uniformity of dimensions, so that we may not have the hundred and one variations in the Jumbos which we have in the L's.

Mr. Beeman, just study the behavior of your bees when they are allowed to follow their own sweet way. It may save you a lot of costly labor, called manipulation, and give you greater returns.

Providence, R. I.



Colony of giant bees transported on an elephant
(See Benton's Travels, page 307).

BEE-KEEPING FOR WOMEN

Conducted by Miss Emma M. Wilson, Marengo, Ill.

Selecting Breeders

While examining my colonies I am always watching each queen, trying to determine which one is the best to use as a breeder. But I am always unable to pick out the one that is superior to all the rest. Quite a number appear to be equally good. When looking over colonies this way it is quite difficult to keep in mind the various points that one should consider. It seems to me that there should be some sort of a score card devised to assist one in this work. I believe all other breeders of pure-bred stock have some sort of system they follow along this line. I am fully aware that some of our largest producers do not care about a thing of this kind, but there are many that do. Most of those who do not care discover that they do when European foulbrood hits them. In my apiary inspection work I have made it a point to find out just what our different commercial beekeepers consider a purely mated Italian queen. Quite a number don't know. And nearly all are at a loss to draw the line between dark Italians and light hybrids. We should have a standard to work to. But it seems that it should be the work of several men.

Ohio.

If I understand aright the suggestion of our correspondent, it is that there should be some sort of a score card to aid in deciding the standing of a queen by direct inspection of the queen herself. It would surely be an excellent thing if we could agree upon certain things in a queen by which we could rate her value; but it seems to me that there would be difficulty in the present case.

A judge, or a set of judges, might pass upon a cow in the show ring and arrive at a decision quite satisfactory. But with a queen the case is different. With a queen before us there are three things we can see—size, form and color. What can we tell from these? Very likely most of us would say we prefer a large queen. But is a large queen always better than a smaller one? It looks a good bit that way. When a queen is in full laying a large part of her bulk and weight consists of the eggs contained in her body. If one queen is 10 per cent heavier than another, is it not reasonable to believe that the difference is mostly in eggs, and that the larger queen will be the more prolific layer? Yet I have in mind a queen that I think was the most prolific queen I ever had, and she was remarkable for her small size, perhaps the smallest laying queen I ever had. (I also remember a similar occurrence.—C. P. D.)

As to form, the difficulty would be less. We would probably agree that a trim-built queen with a tapering abdomen is to be preferred to one that is clumsy-looking and bunty. And right at this point, while noting whether the queen were clumsy-looking, we would note whether she were clumsy-acting by seeing how she moves upon the comb, whether in a sprightly manner, or in a slow and loggy way, as if afraid of falling off the comb. The number of legs might also be considered, yet the loss of a leg would hardly affect her as a breeder.

When we come to the matter of color we are very much at sea. We can tell something from the color of a colony of workers, but there seems to be no direct relation between their color and the color of their mother. She may be quite dark, and yet produce a worker progeny of a bright yellow color.

On the whole, the result of our inspection would seem so meager that we would be likely to fall back on the simple way of judging her value by the amount of honey stored by her worker progeny. Indeed, that's not so very different from the case of the cow. Whether the cow be perfect in all the points of the score card, or whether she fall down badly in some of them, if she produces in the course of the year more butter-fat than any other cow in the world, her valuation would run up into the thousands, and she would be called the champion of the world.

In the same way the queen will be judged by the amount of honey stored by her colony, of course taking into account any circumstances that would have a modifying effect on that amount. For instance, if, early in the season, a frame of brood should be taken from one colony and given to another, and then each should harvest the same number of

pounds of honey, the one from which the brood was taken would be counted the better of the two.

The cow is judged by her performance at the milk-pail; the queen by her performance in the supers.

—C. C. M.

(In a foot-note, Dr. Miller asks the management of the Journal to "fight back" if either one of us disagrees with him. We do not see how we can improve on Dr. Miller's suggestions unless it be in recommending to keep out of the score any queen of impure stock, for the reason that, in a hybrid queen, the qualities are probably not fixed so as to insure the reproduction of similar qualities in her daughters. So we would prefer to rear our queens from a pure queen, purely mated, even if there was in the apiary a queen of impure stock whose progeny produced the largest crop.

We would consider as of importance, as well, the gentleness of the bees which the queen produced and their ability to withstand disease. It seems pretty well established that pure Italians resist European foulbrood better than either hybrids or blacks.

But in selecting between queens of the same race or the same degree of purity, we do not see how any one can find a better test than previous results, in honey.—C. P. D.)

Bees Clustered Outside

Dear Miss Wilson :

Madame: Am writing you to see if you can tell me why the bees cluster on the outside of the hives. Am a beginner and this is my second season, but only my first year to notice every move the bees make. I find that the bees have clustered only on my 3-story colonies and I made 4 nuclei this spring and they do not do this. We have had so much rain this past winter, and then it rained again for a couple of weeks last month. Do you think that the reason for clustering so is because there is very little pollen or honey coming in? My nuclei are doing fine, and upon my last inspection I found they had almost no brood; now why? Do you think our excessive rain has anything to do with this. Am very interested in my bees and am afraid I go in my hives too often. Can you tell me how often I ought to enter my hives in order to prevent them from raising queen-cells. Last year I had such a fight with the bee-moth that I keep a close eye on them, but my colonies are very strong, so am sure there is no danger.

Fairhope, Ala.

Bees probably cluster outside because it is more comfortable there, that is, it is cooler. The more bees there are in a hive the more likely to cluster out, other things being equal. At the close of a hot day you are likely to see a strong colony cluster out after working hard all day. Likely it is a good thing for them; there are more bees there than in the day when many were in the field, and it is too hot in the hive if all stay inside. As it cools off through the night the bees in the cluster will gradually enter the hive, especially if there comes a cold wave, and by morning all will be inside.

From what has been said you will easily see that ventilation has something to do in the case. The less the ventilation the more hanging out. During the hot weather you can hardly have too much ventilation. It is well to have the entrance open the full width of the hive, and anywhere up to 2 inches in depth. Also let the super be shoved forward or backward so as to make a ventilating space of a quarter to half an inch.

If the flow of nectar stops and the weather continues hot, a strong colony may hang out all day, and you can hardly blame them. It would be foolish for them to wear out their wings going to the fields when there is nothing for them, and it would be foolish to stay in the crowded hive when it is cooler outside.

The rain may have had a little to do with it, for during the rain the field bees would be kept home, making it more crowded and hotter.

If you want to keep queen-cells cut out, you don't need to go into the hives oftener than once in 8 or 10 days. But in too many cases the effect of cutting out cells is only temporary, and after a time a swarm may issue only a day or so after you have cut out all cells. It would be a long story to tell how to manage in such cases, but you will find it fully given in Dr. Miller's "Fifty Years Among the Bees."

Selling Comb Honey

Would you kindly tell me what you would think the best plan for selling comb honey?

Until last year I sold about all produced right at home by the pound, most of it in lots of from 10 pounds up to two cases to a customer, not graded as to weight. But last fall, having more than I could readily dispose of at home, and some nearby grocers wishing to buy it at the same price, sold several cases the same as taking 25c as a selling price per pound. In turn they sold it at an advance of 2 and 3 cents per section; one selling at 2c, the other at 3c. With cases of honey weighing all the way from 18 to 23 pounds per case, taking 25c as a selling price per pound an 18-pound case would retail, sold by the section, at the 3c advance, at $7.72, the same as a 23-pound case that brought $5.75. It does not seem a fair plan to either producer or consumer. If cases are graded as to weight in this State, does each section in a case have to be weighed and marked with the net weight ?

ILLINOIS.

The federal law obliging you to mark on each section a minimum weight does not apply in your case, as your honey is not shipped out of the State.

Since there is a good deal of difference in the weight of different sections of honey, the fairest way is to weigh each section and sell it by its weight. You may not want to go to that much trouble, but still you need not sell all sections at the same price. It is a comparatively easy thing to divide your sections into two classes by weight. You might, for instance, adopt 12 ounces as your standard. Set your scales at 12 ounces, and you can rapidly set one section after another on the scales. If the section pulls the scales down it belongs in the heavy-weight class; if it stays up it is a light-weight. You might divide still further by weighing again all your heavy-weights with the scales set at 13 or 13½ ounces. Then you could sell by the section, having the same price per section for all sections in the same class.

From what you say it sounds as if you sold to the grocer at the same price as you sold to the private customer. That is hardly fair to the grocer. He is entitled to his margin of profit to pay him for the trouble of handling the goods, and whatever the price at which he sells, you should not undersell him. If you cannot sell all your honey directly to the consumer, and find it advisable to sell part or all through grocers, then let them distinctly understand that in no case will you undersell them.

DR. MILLER'S ANSWERS

Send Questions either to the office of the American Bee Journal or direct to DR. C. C. MILLER, MARENGO, ILL. He does NOT answer bee-keeping questions by mail.

Queenless Robbers

Did you ever know of a stand of bees to rob, who were queenless? I found one of my stands overflowing with bees in March and went to them in April to get a frame of brood, and they had no brood at all, but were robbing another stand. I gave them fresh brood, but they simply hatched the brood and filled the cells with honey. They had a hive full of honey, mostly all unsealed; *no queen*, and no signs that they had had any since last fall; but lots of bees of all ages, but no drones, and not a cell of brood of any kind appeared. I gave the second frame of brood the last of April and on May 1 the hive had bees of all ages, inside the hive and out. They refused to start a queen-cell, although they were constantly running over the front of the hive, looking for their queen. I failed to find any signs of queen, and about the middle of May I divided them. They were in a hive three stories high, 8 frames to each story, making 24 frames in all, the whole year around, summer and winter. My bees are always heavy with fully 90 to 100 pounds for winter. I gave them each 4 frames of brood and now have 2 good, strong stands full of brood. It is my first experience with a queenless robber stand, and they were surely holding their own. They got two of my stands and I saw one of the stands move over

to them. They must have taken several from some other yard, as they were strong in bees all the time. C. B. PALMER.

ANSWER.—No, I never had a queenless colony that I knew to be robbing other colonies. But I have had queenless colonies—weak at that—that stored well for the number of bees. As a rule a colony that has been queenless for some time is weak and not very aggressive. In the present case the colony was strong and apparently eager to gather. If it found it could make a short cut by taking from another colony honey already stored, why should it not rob as well as a queenright colony? It was fiercely possessed with the desire to store, and this desire was so strong that it overpowered the desire to have a queen This last happens only too often. But queenless robbers are not common, and you may never see them again.

Room for Winter

1. Is there room enough in a ten-frame hive for a strong colony for winter if all supers are taken off?

2. At what latest time should supers be taken off to bring bees to the cellar?

WISCONSIN.

ANSWERS.—1. Yes, in winter there is plenty of room, even if more room would be better in summer.

2. Supers might be taken off a few days before the hives are cellared, or even the day before; but most prefer to take them off as soon as bees stop work on the fall flow.

Two Queens in One Hive

1. Will two queens winter safely in one hive with the old queen above an excluder and the young queen below?

2. Would they do better on separate stands?

3. Some people say bees can't build comb very late in the season; is it true?

FLORIDA.

ANSWERS.—1. They may, but one is likely to turn up missing before the winter is over.

2. Yes; yet if both are very weak they may both die separately, while they might live if separated only by an excluder, even if one queen should be lost.

3. They do very little comb-building late in the season, because comb-building is generally needed little then, but they *can* build comb whenever it is needed, no matter how late.

Fertile Eggs

1. I have a theory that a queen can't lay a fertilized egg unless the walls of the cell gently press the sides of the abdomen. This would account for a fertilized egg in a worker-cell and an unfertilized one in a drone-cell, but have not seen the theory advanced by anyone else. Am I correct?

2. When taking a frame of brood from another hive to be put in a hive when hiving a swarm, should one leave on the adhering bees, or brush them off?

PENNSYLVANIA.

ANSWERS.—1. This theory was held by some more than half a century ago. Others claimed it was the will of the queen that decided the matter. The latter said the former were wrong, because a queen would lay a worker-egg in a worker-cell barely begun. But in this case the cramped position of the queen in bending over might be just as effective as the smaller cell, and I have never seen any satisfactory proof that your theory is wrong.

2. I doubt if it makes any difference.

Improving Stock

I have built up my apiary so fast and devoted so much energy to number of colonies that I have very much neglected quality in stock. I have three colonies that are about all one could wish, good, light-colored goldens, even in color, as gentle as one could wish and apparently no faults; none of the three ever built cells or attempted to swarm.

Now a few questions:

1. Is there any common mistake or fault one is likely to make in breeding from the best queen?

2. Is there anything likely to develop in her daughter queens that it would not be advisable to rear a lot of her virgins and head her colonies with them?

3. Again, if I get a lot of her daughter queens reared and mated in my yard and they prove very satisfactory, then should I rear future queens out of those daughters of hers, or out of her own eggs, in case I still breed her?

In addition to answering these three questions, would you please criticize and comment on this plan of choosing a queen to breed from, and on the proper method of trying out and breeding up from her stock?

I have your book "40 Years Among the Bees," also Doolittle and Pellett's book on queen-rearing, and latest edition of Root's A, B C. LOUISIANA.

ANSWERS.—1. I do not think of any common fault you are likely to fall into unless it be in not becoming familiar enough with the literature you have upon queen-rearing. You have a splendid set of books upon that subject, and should read over and over what is said in them about queen-rearing. Too many own books without owning the ideas contained in them. I might also mention as a common mistake the practice of rearing cells with too small a force of bees. Up to the time a queen-cell is sealed it should always be in a *strong* colony. It is penny-wise and pound-foolish to have cells built in a nucleus, or even in a colony of medium strength.

2. I think not.

3. Better continue to breed from the old queen as long as she lives, unless one of her daughters proves better than the old queen.

In the Journal for July, page 244, the article "Selecting a Breeding Queen," should be of special interest to you. Please study it well. It will be followed later by the plan that is followed "in this locality" for deciding which queen to choose to breed from.

Queen Rearing

Will you give me your best plan for raising queens for my own use? State page in "50 Years Among the Bees," and if since the book was published you have found something better, please let me know what it is.

IOWA.

ANSWER.—In "Fifty Years Among the Bees" 1915 edition, if you will turn to page 218 and read the next 26 pages, you will get the best I know about rearing queens, and I have learned nothing better since.

But I imagine I hear you reply: "I don't want the labor of going through 26 pages; can't you tell me just where I can find on one page just what I need?" If you care enough about rearing good queens, I think it will pay you well to become familiar with those pages. Still, if you insist on getting in the smallest compass what will meet your case, turn to page 244. No; you needn't take that trouble. I'll copy it for you here: "Take from the colony having your best queen one of its frames, and put in the center of the hive a frame half filled, or entirely filled, with foundation. If small starters are used in a full colony the bees are likely to fill out with drone-comb. A week later take out this comb, and trim away the edge that hasn't any eggs. Put this prepared frame in the center of any strong colony after taking away its queen and one of its frames. Ten days later cut out the cells, to be used wherever desired, giving the colony its queen or some other queen."

Requeening

1. In "Fifty Years Among the Bees," talking of placing a nucleus with laying queen in the stand of a queenless colony, you say it never fails in your part of the country. From this I rather gather that there must be a catch somewhere, and would like to know if this will work; make my colony of blacks queenless, and 2 or 3 days later take that hive off its stand and place a queenright nucleus in its place. I would use the brood to form new nuclei, and would hope that the field force would accept the new queen.

2. Doubting that a colony was queenless, owing to a virgin queen not laying, and not to be found, a new queen (black) was introduced, because she happened to be on hand, just run in over the top bars and seemed accepted. There was a pile of her bees dead in front next day, and eggs shortly after that, but as the bees are of the Italian color, and the queen seems very yellow, would like to know if that pile of dead bees was proof that she was not accepted, though her body was not found, and that the queen originally given started to lay.

3. Having several colonies of black bees, and being determined to see the last of them this season, woud like to know if the following is practical and if the result would be good. I put a ten-frame hive with say 5 frames and a laying queen and a frame or two of brood on the stand of the blacks, and the original black colony alongside *without destroying* the queen, taking the old hive completely away in a few days?. I suggest this because I am a side-liner, and grudge the time and stings it takes to find black queens, whereas, if I can leave the whole field force with the new queen, the old one will be easier to find, and when found the whole old brood-chamber can go above to make an extracting super, for there should be no queen-cells started. ARGENTINA.

ANSWERS.—1. I should expect success generally. Something, however, would depend on the strength of the nucleus. The stronger the nucleus the greater the certainty of success.

2. If I understand correctly, an Italian virgin was introduced first, and afterward a laying black queen. The fact that bees and queen are yellow is proof enough that the laying black queen was put out of the way, even though accepted at the first, but I would hardly think the pile of dead bees proof in favor of one or the other, only that there had been two parties among the bees, one party adherents of one queen, and the other adherents of the other, and that there had been a battle between the two parties. In a good many cases where a queen was introduced I have noticed dead bees in front of the hive, indicating that a battle had occurred, although there had been only one queen in the case. Evidently some of the bees were hostile to the new queen, and her friends had massacred the insurgents.

3. There would probably be so few bees with the new queen as to make her situation rather critical. Let me suggest a modification of your plan. Remove the hive from its stand and in its place put a hive with a frame of brood. Set on top of this the old hive, with no communication between them. In a day or two all the field bees will be in the lower hive, giving you your chance to find the queen in the depleted hive above. This hive above will now be in fine condition to receive a new queen, since it will have mostly young bees. After the new queen has become estaolished in her new quarters, perhaps in two or three days, take away the lower hive and set the upper hive down on the stand. The queen will have a strong force to protect her, and will be safe from attack by the entering fielders.

Foulbrood

1. Does foulbrood spread through a swarm that has some contaminated honey in it, or are the bacteria confined to the affected honey the bees have robbed?

2. Do bees bring honey from the hive-body to the supers above during honey-flow, and are bees apt to take honey from the supers above to feed the brood when they have plenty of honey below?

3. Is it sufficient to shake your bees directly from the diseased hive to the new, clean one?

WYOMING.

ANSWERS.—1. Yes, if there is a single cou-

taminated cell of brood, it will spread throughout the hive.

2. They take honey from the brood-chamber, but in a flow they do not carry it down. When the flow is over they are likely to carry it down as fast as vacancies occur in the brood-chamber.

3. Yes; only you had better brush instead of shake.

Equipment

1. Are the protection or double-walled hives satisfactory, and what size frame is best?
2. How large a bee-space should a honey-board have, .163 inch perforations, or .172 inch?
3. What bees are the best?
4. Is bee-bread any good?
5. Are the aluminum honeycomb frames satisfactory? Would you advise me to get them altogether?
6. Are the wiring, nailing and wedge clamping devices advertised all right?
7. What is the best device for putting together sections, in starters, etc, at one handling. IOWA.

ANSWERS.—1. Opinions differ, and localities differ. Most Iowa beekeepers prefer single-walled hives wintered in cellar.

2. Likely .163 is better.

3. Three-banded Italians are generally preferred.

4. It is often of more value than honey. No young bees can be reared without it.

5. They are as yet new, and largely untried.

6. Likely they are, although all may not be of equal value. I must confess ignorance, in that I have not tried all of them.

7. I don't know. Some think it better to have two machines, one to put the sections together and one to put in the foundation.

Foulbrood

In treating foulbrood nearly all writers say to put the bees on foundation starters until they have cleaned themselve of infected honey and wax and then give them full sheets to begin over with. Please tell me why it would not do as well to cut out all brood and honey from infected frames of combs, just leaving enough dry comb at the top to show them where to start, instead of furnishing new frames with starters to be destroyed as soon as used? KENTUCKY.

ANSWER.—Instead of brushing twice, as you mention, isn't it the general practice nowadays to do the one brushing upon full sheets? One objection to your plan is that it would be inconvenient. You would hardly want to cut out combs in less than three weeks after treatment, for you want the brood to hatch out. Also, to leave a margin of dry comb would be just what you don't want, for you don't want the bees to have a place to deposit the infected honey, but you want them to use it up before there is brood to be fed.

Extracting—Bees Loafing

1. I am just a beginner in this busy bee business and would like to know how honey is extracted, where only one or two stands of bees are kept and no extractor in the neighborhood.

2. I have a 10-frame hive with super in a well-shaded place and for three weeks or more a large number of bees cluster on the outside of the hive, and sometimes hang in bunches the size of a baseball under hive-stand in the hottest part of the day. Sweet clover is in full bloom and the worker bees seem to be just as busy when this occurs as at any other time, but have difficulty in entering hive with so many bees crowding the entrance. UTAH.

ANSWERS.—1. Without an extractor there is no way to get the honey and save the comb. You can crush the comb and strain out the honey through a cloth, or you can melt the combs, let cool, and then take the cake of wax off the top, but neither of these ways is very satisfactory.

2. It is nothing very unusual for bees to hang out in this way, and when it occurs at a time when there is plenty of bee-forage in the fields, it is generally due to the heat and too little ventilation. Give plenty of shade and ventilation; you can hardly overdo the matter. (Possibly they need more super room.—Ed.)

Wintering Equipment, Etc.

1. Which is the best way to winter bees, indoors or outdoors?
2. Is Michigan a good state for beekeeping, and which part is the best?
3. Which is the best packing when you winter bees outdoors?
4. Does it pay better to feed bees honey, or syrup, in spring?
5. How do the Dadants winter their bees?
6. What is the average of pounds in Texas of honey secured as a surplus? in Michigan?
7. Should bees have shade or not?
8. Where can one secure a 20-frame hive?
9. One of the most successful beekeepers of the United States told me that Texas was the best State for beekeeping; do you agree? I think the temperature is unbearable down there, and unhealthy, so I would not like it much there.
10. Is the Dadant hive a better hive than the Langstroth, and how many frames has it? ILLINOIS.

ANSWERS.—1. North of parallel 40 or 41 bees are generally cellared, although some prefer outdoor wintering; south of that they are wintered outside.

2. Michigan is good, especially north, where fireweed and wild raspberry abound.

3. It is largely a question of what is convenient for you. Chaff is good, also leaves, and planer shavings.

4. Honey; it contains elements necessary for the welfare of bees that are not at all found in sugar.

5. Outdoors.

6. I don't know.

7. Better in general to have shade.

8. I suppose they can be made to order at any hive factory.

9. For those who live there and like Texas best, it is probably the best State. Like enough Illinois is better for you.

10. The Dadants and others who use it like the Dadant better, and like enough some others who do not use it would also like it better if they should try it.

Shaking

1. In the American Bee Journal for April, 1917, page 135, in answer to "Pennsylvania," paragraph 3, you say: "However, it will be all right if you leave at least one frame without shaking, provided it contains one or more good cells." Do you mean by that that the bees will rear a good queen if they are not shaken, which I never do, until the cells they have started are well advanced or nearly ready to seal, or would it be better to take away the queen and two frames of brood as advised? I want to raise the best queens possible, but have a hard time finding the queen, and want to avoid that trouble if possible. How would it do to leave three or four frames unshaken, including the one with the cells, set the hives close together at the old location and within a week shake or brush again and put the hive with the sealed cells on a new stand?

2. The first lot of honey I took off the hives this year has, when the combs are held in front of a strong light, a deep orange or reddish color, and the honey seems to be rather thin, and to me it hasn't the flavor of other years, although people to whom I have given some thought it was good. I have not, however, so far noticed any peculiar smell about it. Do you think there is honeydew mixed with it? If there is, is it fit to eat? Would it be all right to feed to the bees next spring, if they need it? Other years my honey was always of a very pale yellow color when held to the light, and people here and at Philadelphia always told me that it was of extra fine flavor. The honey that is ready to take off now looks much better. PENNSYLVANIA.

ANSWERS.—1. In the sentence quoted the point made was that it would not do to shake queen-cells, as that would spoil them, but to avoid shaking, the bees must be brushed from the combs, or at least one frame containing one or more cells should be brushed and not shaken. So I hardly meant just what you say. Still it is true that if you wait till the cells be about ready to seal, and then brush (not shake) you ought to secure good queens. The only object of removing the queen in the instructions given was to get cells started, and if the cells are already started there is no need to remove the queen. If I understand your present proposal, it is to divide the colony into two hives, cells being in each hive, and then a week later move to a new stand the queenless hive, leaving on the old stand the queen and most of the bees, and on the new stand all or nearly all the brood with bees enough to protect the brood, no cells being left with the queen. That will be all right, only that in some cases there might be danger of the queen swarming before the second taking of brood from her.

2. It looks as if the specially colored honey was from some particular plant rather than from a mixture of honeydew. However, even if there is honeydew in it, it will be all right for the table for anyone who likes it, and it will be all right to feed next spring, although honeydew is not good for winter stores.

Division—Packing

1. Our bee forage through the season is first the willows, soft maples, fruit bloom, alfalfa, yellow and white sweet clover, basswood, sumac, heartsease or smartweed, besides other flowers. Now I want to divide my colonies. Frost comes about the 10th or 15th of September, here in Nebraska. Would it not be better to divide about the 10th or 15th of August.

2. Now, about packing for winter. I intend to leave them on their stands. I thought of taking tar paper and wrapping it around the hives, driving a stake at each corner, to leave a space of about 4 or 5 inches and packing with dry leaves or fine straw, putting a super on top with leaves in it with cover on top and bring the paper up to the cover and tacking it to keep the water out.

3. Would it do any harm to give them all the sugar syrup they will take?

4. Would you winter them in 2 hives or just brood-nest, with a packed super on top? NEBRASKA.

ANSWERS.—1. That is likely to work well if you save up frames of sealed honey from that gathered earlier, so as to give to any colonies that do not gather enough after the division.

2. That ought to work.

3. You are not likely to have the brood-chamber too full of stores unless it be so full next spring that the queen hasn't room to lay in; only remember that sugar is not as good as good honey. (It is better winter feed for bees outside.—F. C. P.)

4. If you mean two stories without the packed super on top, I should prefer the one-story with packed super; but would a little rather have the two stories with packed super.

Metal Covers—Honey Plants

1. Which would you prefer, a wood or metal cover for a hive? Would not the metal cover have a tendency to heat and smother the bees and melt the honey more than the wood if hive is exposed to sun?

2. Could not alfalfa be used for hay and at the same time for a honey plant?

3. Describe buckwheat as a honey-plant; time it should be sowed, etc. MISSOURI.

ANSWERS.—1. Metal; that is, a wooden cover covered with zinc or tin. I have such covers that have an air space between two layers of thin boards, and I think there is less trouble from the heat with them than with covers all wood.

2. I don't know that there's any place where at least part of the alfalfa is not used for hay. But there will generally be some

bloom before it is cut for hay, and some will be allowed to bloom for seed.

3. Buckwheat is one of the best honey-plants, yielding one of the darkest honies, liked more than the lighter honies by some, and disliked by others. In some places it fails to yield in some years, and in all places generally yields nothing in the afternoon. For full information see the books, or send to U. S. Department of Agriculture, Washington, D. C., for bulletin on buckwheat. (Buckwheat yields but little honey in Missouri.—F. C. P.)

Behavior of Queen

IN long and continued observations of colonies in observation hives. I have repeatedly observed an action on the part of the queen which I am beginning to believe may cause swarming at times when it is not easily explained. You know bees sometimes swarm out and leave brood behind, shortly after hiving, or at times swarm with queen-cells only started. This has always been puzzling.

Observation of a queen here in a weak one-frame nucleus shows her repeatedly searching for empty cells, which in her case, are only found **outside** her small cluster. She wanders off, usually alone, poking her head into these cells, but **not** laying. Frequently I have seen her go too near the entrance. In doing so she flutters her wings, probably making some sound which I cannot hear, but which **immediately arouses the entire cluster so that many of them rush toward her.** Once I saw some of the bees **rush outside the entrance** while others headed her off and actually seemed to push her back, with their antennae, toward the cluster.

Might not such wanderings on the part of a queen be the cause of some of our inexplicable swarming under abnormal conditions? I believe it is, when she wanders too close to the entrance and may be seized with a desire to try a flight. Anyway, I give you the observation for what it may be worth.

KENNITH HAWKINS.

St. Louis Beemen Organize

St. Louis, Mo., May 23.—A group of local beekeepers recently met and formed what will probably be known as the Mound City Bee Club. The purposes of the organization will be:

To learn to keep bees better.

To co-operate with inspectors in preventing and curing disease, and to protect, if possible, members from purchasing bees which are known to be affected.

To diplomatically discourage "nail keg" beekeeping as a menace to the industry.

To join with other honey producers of the State in a united effort to bring about more beneficial legislation at Jefferson City.

To secure expert instruction at meetings, and, if possible, representation at conventions.

To pool their wits and efforts in solving problems which could not easily be overcome individually.

To collectively stimulate honey consumption by the distribution of proper literature and judicious advertising.

To endeavor to standardize packages—at least locally.

To learn to calculate production costs.

To collectively purchase supplies.

And last, but not least, to enable the enthusiasts to meet and "get it out of their system,' 'and be thereby no longer a bore to their long-suffering friends who don't care a rap about bees.

All interested local apiarists who would like to help swell the crowd at the next meeting are invited to communicate with the undersigned.

A. G. VAN RONZELEN,
223 Dover St.

Honey Granulation—Bees in Pound

Replying to enquiry of "Ontario," page 254, June issue, relative to granulation of honey; here my experience and observation show that the more thoroughly the honey is ripened (regardless of the source) the finer the grain and more compact the texture, even to almost the smoothness of the choicest and purest of lard.

In reply to your comments, page 206, same issue, relative to the number of bees contained in a pound and the amount of nectar, by weight, that they carry, will say, the whole situation is guesswork, and my estimate was based upon actual weight of empty bees and bees loaded during a good honey flow, and not the halfway situation in either instance, and to my mind the only way to know positively and accurately would be to weigh at least one-fourth pound of bees that had actually starved and another one-fourth pound of those known to be loaded, honey-sacs full of nectar, and when this is done you will find that my estimate is the more nearly correct. ELIAS FOX.

Increased Appropriations

Several States have appropriated liberal sums for beekeeping work at the recent sessions of the legislature. Among the latest reports is that from the State of Connecticut, where the money available for bee inspection has been increased from $1,500 to $4,000. A law also was enacted requiring all beekeepers to register with the town clerk. If the provisions of this law are generally complied with it will enable inspectors to locate all the bees in the territory where they are at work.

Don't Like the Italians

I would like to see a discussion of the different breeds of bees. I think that the Carniolans and Caucasians are the best honey gatherers. I have no use for the Italians. They may be all right for extracted honey.

WINSOR W. LANTIS,
Perry, Mich.

(The above letter is a reminder that the Italians have had far more publicity than other races. Let us hear from the beekeepers who have given other races a fair trial.—Ed.)

NEWS DISPATCHES

Bees Sting Horses

Vincennes, Ind.—A swarm of bees which settled under a team hitched to a disc on the John Wampler farm frightened the horses and caused them to run away. The farmhand on the disc was thrown off and dragged a considerable distance. One of the horses struck its leg against one of the sharp discs, severing it. The animal was killed.—Indianapolis Times.

Stray Swarms Hived By Firemen

Yakima, Wash.—A recent newspaper report of the capture by Yakima firemen of a swarm of bees in a tree near the fire station has been followed by a number of telephone calls from all parts of the city asking the firemen to "come and get a swarm of bees just outside my house." As a result, the firemen have collected an apiary of nine stray swarms, which are hived near the fire station and apparently are contented and thriving.—Seattle Post Intelligencer.

Bees Used in Battle

Probably the most remarkable weapons of war ever used were swarms of bees. There are at least two well-authenticated instances of the use of this novel and stinging war material.

The first is related by Appian, of the siege of Themiseyra, in Pontius, by Lucullus, in his war against Mithridates. Turrets were brought up, mounds were built and huge mines were made by the Romans. The people of Themiseyra dug open these mines from above, and through the holes cast down upon the workmen bears and other wild animals, together with swarms of bees.

The second instance occurred in Enilant. The Danes and Norwegians were attacking Chester, held by the Saxons and some Gallic auxiliaries. After adopting stoning and boiling water in vain against the besiegers, the Saxons threw down all the beehives in the town upon the attackers, who were soon routed.—Toronto Evening Telegram.

Spacing of Combs, Etc.

Would you advise the spacing of combs 1½ inches from center to center? With this additional space wouldn't the bees elongate the cells in the extracting supers? I find with the above spacing a 10-frame hive would require about nine combs. Would nine combs be all right in the brood-chamber when the bees go into winter quarters?

I examined a 2-story hive a few days ago and found a laying queen above and below. How did that queen get into the upper story, with a wood and zinc queen-excluder between the two bodies?

I put the upper story underneath a queenless colony with one thickness of newspaper between them. Should I have used more than one thickness of paper?

Illinois.

You will do well to space 1½ inches. Nine frames in a ten-frame brood-chamber will allow good wintering, and those successful beekeepers, the Dadants, attribute their almost total immunity to swarming mainly to the fact that they have large hives and also wide spacing. In a brood-comb filled with sealed worker-brood, the combs will be of the same thickness, whether they be spaced 1⅜ or 1½. The thickness of such a sealed comb is not far from an inch, leaving a space of about ⅜ inch between two combs where the combs are spaced 1⅜. With 1½ inch spacing the space between two combs is about half an inch. So with the larger spacing there is more room between combs than with the smaller spacing, and this makes the bees less crowded, and it is easy to believe that they will be cooler and less inclined to swarm.

As to wintering, the probability is that there would be no trouble if combs were spaced anywhere up to 2 inches apart. In our cellar in winter it is a pleasant sight to see bees of a strong colony clustered below bottom-bars and filling entirely the 2-inch space between bottom-bars and bottom-board. If a 2-inch cluster is all right under the frames, why not between them, thus making them spaced 3 inches apart from center to center?

One way to account for a queen above the excluder, beside the one below, would be to say that a queen was reared in the upper story, either because brood had been above or because bees carried an egg above.

One thickness of newspaper is enough to use when uniting bees in two different stories.

Bees and Fruit

Spokane, Wash., July 10.—An interesting clash of interests appears to have developed in the fruit-producing district, of which Spokane is the commercial center, as between fruit growers and apiarists.

One side of the subject is set forth in a statement by E. B. Kelly, State Agricultural Inspector, who says: "Never before has the Inland Empire apple crop showed up the need of bees in this district as it has this year. Many apples will be lost this year because of lack of proper pollenization, and although the loss does not compare with the frost damage, it is very noticeable. There are a few bees in the Inland Empire, but the majority of fruit growers depend too much upon their neighbors' bees for charity work and sooner or later the live producer will see the need of having a good stock of bees on his own farm.

"If bees are introduced into the Inland Empire on a large scale, the farmers will first have to provide better means of feeding. Food secured by the bees during the fruit season will not be enough for their winter supply and every corner and nook will have to be sown in clover."

Quite another aspect is presented in a dispatch from Prosser, Wash., as follows: "Startling mortality among bees indicates an unusual shortage of honey in the Yakima Valley for the present season. Tons of honey were shipped from this locality last year and brought fancy prices. W. H. Tucker, who had over 200 stands of bees, which yielded him an income from $25 to $54 a stand last year, reports that he will have no honey for sale this year.

"He states that the unusual value of the apple crop has caused orchardists to continue spraying much later than heretofore and in much heavier quantity. The chemicals in the spray fluids is killing the bees by the million. Mr. Tucker started this season with 250 stands, 50 of which have been entirely wiped out, and no more than 10 to 20 per cent of the inmates of the remaining stands still survive."

The subject will be debated at fruit growers' conventions this fall. There seems to be a strong conflict of opinion as to whether the spray used to combat coddling moth is fatal to bees.

Louisiana Meeting

J. F. Archdekin, Big Bend, was named President of the Louisiana State Beekeepers' Association at Baton Rouge, Friday, August 8, when the first meeting of the kind ever held in the State was called as part of the Tenth Farmers' Short Course. E. C. Davis, Federal Extension Agent for Louisiana, who was named Secretary, was instrumental in the calling of the meeting. Other officers are: Geo. H. Sexton, Atchafalaya, Vice President; R. L. McCoy, New Roads, Second Vice President, and F. M. Morgan, Hamburg, Treasurer. Thirty-seven charter members joined, and Mr. Davis expects the list to swell to 100 before January 1. Talks at the meeting were given by J. F. Archdekin, F. M. Morgan, Geo. Sexton, C. J. Free, R. L. McCoy and Rev. G. P. White. Louisiana is not overcrowded in beekeeping, and this new organization presages a great future development. K. H.

FOR SALE—Hardy Italian queens, 1, $1; 10, $8. W. G. Lauver, Middletown, Pa., R. 3.

FOR SALE—Three-banded Italian queens; untested queen $1, six, $5.50; twelve, $10. Tested queens $2 each.
Robert B. Spicer, Wharton, N. J.

EDSON APIARIES increased queen rearing facilities will insure the prompt delivery of A1 laying Italian queens, leather colored or golden. Prices reasonable Address
Edson Apiaries, West Butte, Cal.

FOR SALE—Golden queens second to none, for honey gathering and gentleness are unsurpassed; untested $2, tested $5 to $10.
E. V. Marston, Roxbury, Va.

FOR SALE—J. B Brockwell's golden queens, untested $12 per doz., $7 for 6, $1.50 each; 3-frame nuclei $8, with queen. Tested queens $3 each. J. B. Brockwell, Barnetts, Va.

QUEENS, QUEENS—We are now up with orders; are mailing queens day after receipt of rush orders. No disease; satisfaction guaranteed. Best Italian untested queens 1 for $1, 12 for $11.50, 50 or more 90c each. I will care for your interests.
W. E. Achord, Pike Road, Ala.

FOR SALE—20 colonies bees, mostly Italians.
A. C. Gould, Weston, West Va., Route 4.

WARRANTED QUEENS—Dr. Miller's strain, $1 each, $10 per doz.; tested $1.50 each, $15 per doz. Safe arrival and satisfaction guaranteed. Geo. A. Hummer & Sons.,
Prairie Point, Miss.

"SHE SUITS ME" Italian queens, $1.15 each, from May 15 to October 15; 10 or more, $1 each. Allen Latham, Norwichtown, Conn.

FOR SALE—One hundred stands of bees in 8 and 10-frame hives, wired frames; bees healthy. Write for prices and particulars.
Duane Shaw, Palestine, Ill.

WANTED—Second-hand honey extractor; state make, condition and price.
J. Stevenson, Richmond S. I., N. Y.

FOR SALE—Baby swarms, three frames and queen, $5. J. A. Dougherty,
Box 66, California, Hamilton Co., Ohio.

FOR SALE—Italian bees and queens (the kind that fill from 2 to 6 supers). Bees, $12 a colony; queens, $2 each, 6 for $11. Queens go by mail, bees by express. Order direct from this ad. Miss Lulu Goodwin,
Mankato, Minn.

FINEST THREE-BANDED Italian queens for $1.25, 6 for $7. J. W. Romberg, Apiarist,
3113 Locust St., St. Joseph, Mo.

HONEY AND BEESWAX

WE BUY HONEY AND BEESWAX—Give us your best price delivered New York. On comb honey state quantity, quality, size, weight per section and sections to a case. Extracted honey, quantity, quality, how packed, and send samples. Chas. Israel Bros. Co.,
486 Canal St., New York, N. Y.

FOR SALE—New clover honey in new 60-lb. cans, 2 cans to case; also buckwheat honey in kegs and cans. Write for prices; sample 15c.
E. L. Lane, Trumansburg, N. Y.

FOR SALE—5,000 pounds clover extracted honey, new crop, two 60-lb. cans to case, 25c per pound. J. P. Goodwin,
South Sioux City, Neb.

FOR SALE—Clover extracted honey of finest quality, in new 60-lb. cans, two to the case, at $24 a case. Order from this ad.
Martin Carsmoe, Ruthven, Iowa

HONEY—Pure extracted clover and basswood, choicest quality; one 60-lb can, $13.50, two cans in case $26. Sample 10c.
The Riverview Apiary,
Ed. B. Klimaschesky, Mahnomen, Minn.

WANTED—Clover honey, comb and extracted. Buckwheat considered if price is right. State lowest cash price at your station. Sample will be requested if price suits.
The Forest Honey Co.,
2323 S. Woodstock St., Philadelphia, Pa.

FOR SALE—6,000 lbs. of honey, mesquite blend; well cured, in new 60-lb. cans; two cans to case. Subject to best cash offer, F. O. B. here.
Chas. Heim & Sons, Three Rivers, Tex.

WANTED—Honey, in light and amber grades. Send sample, stating quantity, how put up, and lowest cash price delivered in Spring Valley. Ed. Swenson, Spring Valley, Minn.

FOR SALE—15,000 pounds of fine clover and basswood honey. The best offer takes it if satisfactory. Chester E. Keister, Clarno, Wis.

FOR SALE—New crop clover extracted honey, two 60-pound cans to case, 25c per pound.
H. G. Quirin, Bellevue, Ohio.

WANTED—Comb, extracted honey and beeswax. R. A. Burnett & Co.,
6A12t 173 S. Water St. Chicago, Ill.

WANTED—Shipments of old comb and cappings for rendering. We pay the highest cash and trade prices, charging but 5c a pound for wax rendering. Fred W. Muth Co.,
204 Walnut St., Cincinnati, Ohio.

WANTED—Extracted honey, all kinds and grades, for export purposes. Any quantity. Please send samples and quotations.
M. Betancourt, 59 Pearl St., New York City.

FOR SALE

FOR SALE—My 5-acre piece of land, with modern 8-room house, good barn, chicken coop, bee house and woodshed; all in good condition. Reason for selling, going on a farm. Address Theo. L. Thompson,
Spring Valley, Wis., Rt. 4, Box 7a.

FOR SALE—Blue vine seed, or climbing milkweed (*Genolubus Laevis*), 6 pods containing innumerable seed mailed to any address upon receipt of $1.
S. H. Burton, Washington, Ind.

FOR SALE—Or Trade for Honey—Used 5-gal. cans, bright; case of 2, $1; not so sightly, but bright inside, case of two, 80c; no leakers. E. H. Bruner,
3836 N. Kostner Ave., Chicago, Ill.

FOR SALE—Or will exchange for bees—One 240-egg Old Trusty Incubator, in fine shape, price $20 One 38-55 Winchester rifle, in good shape, $12. Jas. D. Webb, Hazelhurst, Wis.

BLACK SIBERIAN HARE—World's greatest rabbit for fur and meat. Write for information.
Siberian Fur Farm, Hamilton, Canada.

FOR SALE—Clover and buckwheat honey in any style container (glass or tin). Let us quote you. The Deroy Taylor Co.,
Newark, N. Y.

FOR SALE—Cedar or pine dove-tailed hives; also full line of supplies, including Dadant's foundation. Write for catalog.
A. E. Burdick, Sunnyside, Wash

FOR SALE—Photo of L. L. Langstroth, inventor of movable-frame hives, size 7x9; price, $1. American Bee Journal,
Hamilton, Ill.

FOR SALE—"Superior" Foundation (Weed process). Quality and service unexcelled.
Superior Honey Co., Ogden, Utah.

FOR SALE—8 acres land, 300 colonies bees; land in high state of cultivation, growing second crop now; price per acre, $200. Apiary in three yards; production highest average in 10 years, 96 lbs. extracted honey, lowest 23 lbs, per colony. S. Mason, Hatch, N. M.

FOR SALE OR TRADE—Model 10 Royal standard typewriter, visible; like new; cash $50. Cost $100. E. A. Harris, Albany, Ala.

FOR SALE—$4,800, 183 acres two miles from Pleasant Lake, N. Dak.; 100 acres of it in wheat. The crop goes with the farm, if sold promptly. Near the main line of the G. N. R. R. Address,
"R," American Bee Journal Office,
Hamilton, Ill.

WANTED

WANTED—Your old combs, cappings or slumgum to render into beeswax by our high steam pressure wax presses.
Dadant & Sons, Hamilton, Ill.

WANTED—Your order for "Superior" Foundation. Prompt shipments at right prices.
Superior Honey Co., Ogden, Utah.

WANTED—I have a fine location in California and want a man to associate himself with me in the beekeeping business. I have the stock of bees and equipment here in Arizona; wish to ship all to a certain point in California this fall; have an attractive proposition to offer the right man that can invest in half interest in what I have. Tell your story in first letter.
J. B. Douglas, Box 1085, Tucson, Ariz.

SUPPLIES

FOR SALE—Good second-hand empty 60-lb. honey cans, two cans to the case, at 60c per case, f. o. b. Cincinnati; terms cash with order. C. H. W. Weber & Co.,
2146 Central Ave., Cincinnati, O.

MY FEEDER—Make 'em yourself. I tell you how. Won't rust. Sample and tool postpaid, 24c. Dr. Bonney, Buck Grove, Ia.

FOR SALE—Beehives and supers. Address Thos. Cordner, Rt. 7, Sparta, Wis.

SPECIAL—Best No. 1 Sections, per crate of 500, $3.50; other goods in proportion. Price list free. H. S. Duby & Son, St. Anne, Ill.

MISCELLANEOUS

E. D. TOWNSEND & SONS, Northstar, Mich., offer their 1919 crop of white clover and white clover and basswood blend of extracted honey for sale. This crop (it's only a half crop this year) was stored in nice, white, clean extracting combs that had never had a particle of brood hatched from. We had more of those extracting combs than we could possibly use this year and we piled them on the swarms as needed and *not a single ounce of honey was extracted until some time after the close of the white honey flow*, consequently *none* could be produced that will excel this crop of honey. Of course, it is put up in new 60-lb. net tins and they are cased up for shipment, two in a case. If you are one of those who buy "just ordinary" honey, at the lowest price possible, kindly do not write us about this lot of honey, but if you can, and have customers who will want the very best and are willing to pay the price, order a small shipment of this fine honey as a sample, then you will know just what our honey is, and whether it is worth the little extra price we ask for it or not. We quote you this fine honey, either clear clover or that containing about 5 per cent of basswood, just enough basswood to give it that exquisite flavor relished by so many, at only 25c per lb. on car here at Northstar. Kindly address with remittance, E. D. Townsend & Sons,
Northstar, Mich.

Don't stop advertising.
because honey is high. Make it more in demand, so the price will stay where it is. Little stickers on your letters, papers, etc., will help. Printed as below in bright red.

Price of 1,000 gummed, 35c.
American Bee Journal Hamilton, Illinois

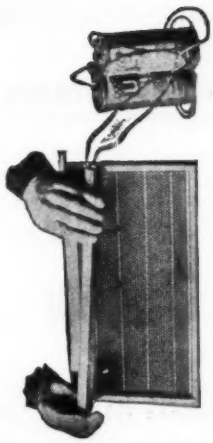
ATTRACTIVE CLOTHES

Do not make the man, but they add greatly to his appearance.
Just so with your honey. It must have quality, but should have a neat package and an attractive label.
We can furnish the label. In many sizes and shapes suitable to fit any container.
Write for our new price list of honey labels and stationery.
American Bee Journal, Hamilton, Ills.

WESTERN BEEKEEPERS!

We handle the finest line of bee supplies. Send for our 68-page catalog. Our prices will interest you.

The Colorado Honey-Producers' Association
1424 Market Street, Denver, Colo.



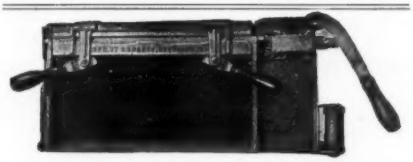
ELECTRIC IMBEDDER

Price without Batteries $1.25

Actually cements wires in the foundation. Will work with dry cells or with city current. Best device of its kind on the market.

For sale by all bee supply dealers

Dadant & Sons, Manufacturers HAMILTON, ILL.



PAT. JULY 30, 1918

C. O. BRUNO NAILING DEVICE

Made for the Huffman Brood Frames. A combined Nailing, Wiring and Wedge Clamping Device. Has been tried and is guaranteed to do accurate work.

PRICE $7.50

Complete directions for operating are furnished with each device.

Manufactured by C. O. BRUNO
1413 South West Street, Rockford, Illinois

Queens by Return Mail

Bred from the best three-band Italian stock. Nothing better. Single, $1.25, six for $5.50, twelve for $10.00. Breeders $3.50.

A. B. MARCHANT
DOCTORTOWN, GA.

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We do all kinds of book binding, such as magazines like the "American Bee Journal," or any other publication. Also make any style blank book, either printed or unprinted heading

Send us your order for blank books and let us bind your magazines.

Following are prices of binding magazines:

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LUTZ & STAHL, Keokuk, Iowa

Read *"THE BEEKEEPER"*

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Send for a free sample copy

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TEXAS BRED QUEENS

THE SUCCESS OF BEEKEEPING DEPENDS ON GOOD YOUNG QUEENS

We will have several thousand for sale this Fall, also booking orders for next year. Send for *Free Circular* giving prices, etc., for Spring delivery. We will guarantee shipments to be made on time; circular explains. September and October is considered the best time for southern beekeepers to requeen.

	1	6	12	50
Untested	$1.25	$6.50	$11.50	$40.00
Select Untested	1.50	7.50	13.50	48.00
Tested	2.00	10.50	18.50	
Select Tested	2.75	15.00	27.00	
One pound package of bees	$2.40—25 or more			$2.16 ea.
Two pound package of bees	4.25—25 or more			3.83 ea.
Three pound package of bees	6.25—25 or more			5.62 ea.

Prices of regular Nuclei, also Nuclei on ALUMINUM COMBS, given in circular. We have shipped for several seasons thousands of pounds of bees all over the United States and Canada. Add price of Queen when ordering bees.

NUECES COUNTY APIARIES E. B. AULT, Prop. Calallen, Texas

QUEENS QUEENS QUEENS

GOLDEN AND THREE BANDED QUEENS

The demand for our Famous Disease Resisting, Honey Gathering Hustlers is greater than ever before. Untested, 90c; 50 or more, 75c each. Select untested, $1; 50 or more, 90c each. Tested, $1.75; select tested, $2. Virgins, 40c. All Queens by return mail, or soon.

BOOK YOUR ORDER NOW

M. C. BERRY & COMPANY, Hayneville, Ala.

Crop and Market Report

Compiled by M. G. Dadant

For our September report we asked the following questions of our reporters:

1. What has the yield been?
2. What do you expect in the fall flow?
3. How is honey selling, and what is being offered for the same?
4. Is there tendency to go back to comb honey, owing to the demand for it?
5. Give information on prices and future prospects.

THE CROP

It is unfortunate that the crop has been as short as our reports would indicate. We would judge that the total crop will fall considerably short of last year, this owing to the fact that there will be a falling off in many of the larger producing areas, as in the inter-mountain States and in California.

The New England States report the crop as only fair, but not near up to last year. Nor is New York up to the average. Prospects are yet favorable, but it is doubtful if the total crop will come up to last season.

In the South, conditions are about up to last year, with some localities reporting less and some more. Kentucky has about two-thirds of a crop, while Alabama is above average. Louisiana is poor, as is Arkansas.

In Texas the crop has about come up to expectations and is generally much better than last year, some claiming 200 per cent more than in 1918. The flow has been interfered with to some extent by excessive rains. The mesquite flow has suffered in this manner. But the crop the State over is very good, and beekeepers are much encouraged. They are beginning now to recoup their losses.

The whole white clover area will have scarcely any crop, though there are spots, such as Wisconsin and western Iowa, where the crop will be good. Illinois will have no clover honey to speak of, nor will the bulk of the white clover producing area.

Michigan will have less than a half crop, while Wisconsin may have more.

Reports vary from the inter-mountain territory, but indications are that the crop will not bulk up to what it was in 1918. Colorado is fair, with Montana, Utah, Wyoming and some other States much below what they expected.

In California all of the reports, with the exception of probably one, indicate that the crop is not much over half of what it was in 1918, and that it cannot be over 60 per cent of normal. Drought has cut in on the bean crop, and indications for future crops are not of the best.

All in all our guess is that the crop for the whole country will not be much over 75 per cent of what it was last season.

FALL CROP

Very few localities report fall crop prospects, and their bearing on the total is so small as to be neglected. In the Central States, those located near the Spanish needle and other fall flower fields, are hoping that their bees can at least pick up enough to put them in good condition for winter.

HONEY SALES, ETC.

Honey is probably selling as readily as it ever has at this season of the year, except when the sugar restrictions were in effect. In fact, the shortage of sugar recently and the high prices of fruits to can has probably increased the demand over normal.

Most of the honey moving as yet, in the hands of dealers, is of last year's crop, which in many instances is being sold at a loss so as to clean up the old honey and get ready for the new crop coming in.

EXTRACTED TO COMB

Very few are thinking of changing back to comb honey, although there is a possible tendency that way. The price of extracted has remained so high, and comb honey prices so low in comparison, that the change back has not been tempting. It may be that the shortage of comb honey will assert itself later on and that its price will advance so as to be an extra inducement for next season.

PROSPECTS FOR HONEY PRICES

In most instances producers are being offered from 14 to 16 cents for amber honey and from 16 to 18 cents for white, with many sales at these prices. We understand that one of the biggest bottlers of honey is offering and has bought some white honey at a price of 18 cents. Buyers, as a rule, do not seem anxious to offer, and this is not to be wondered at, since most of the big wholesalers and bottlers have stocks on hand from last year which they would be glad to clean up at last year's prices. In fact some of them are selling at a loss. We got one report of 1,200 cases bought at 26 cents last fall being sold for 12 cents this summer. We hardly believe that the loss has been this great in most instances, but we do know of one or two instances in which 25-cent honey has gone begging when offered at 20 cents. Naturally this is going to hold back many advance offers on honey on the part of the fellow who is still holding over some of his 1918 purchases.

We do not believe, however, that the beekeeper need be fearing a slump in the honey prices. This honey will gradually clean up, and we hope that the market will stiffen as fall approaches.

Surprising as it may seem, practically all producers are holding for better prices than are being offered. Nearly all reporters we are in touch with desire prices of at least 18 cents for amber and 20 cents for white honey, and many of them state that they must have last year's prices, approaching 25 cents, before they will sell.

Of course, the market is still bound to be unsettled, but it hardly seems possible that honey prices will hold to where they were a year ago, when the sugar embargo was in effect, the war on, and the price inflated, so to speak. We do believe, however, that a price approaching 20 cents for white honey should obtain, and the shortage of sugar should have not a little to do in getting it, and even in pushing it to a higher point. Such prices should be sufficiently remunerative to the commercial beekeeper.

THE NEW ROOT-WEED COMB FOUNDATOIN

More than 40 years ago, A. I. Root, while turning a clothes wringer, conceived the idea of a comb-foundation "mill" making practical the production of real comb foundation.

About 25 years ago A. I. Root and his organization encouraged, assisted and financed the inventor of the celebrated Weed Process of forming strong tough sheets of wax, as different from the old process of "dipped" sheets as the finest steel is different from pig iron.

And now, in the semi-centennial year of the Root organization comes **the most important announcement of all.**

After years of experimenting we are exceedingly pleased to announce to our many friends and customers that we will in the near future be able to supply a comb foundation made

NEARER TO NATURE

A new process of ***Root-Weed Comb Foundation*** which we believe is one of the greatest improvements in comb foundation making that has ever been made. Our new process has to do with the refining of the wax and with the milling, resulting in a product more nearly resembling the natural mid-rib of the comb than any other foundation.

Before placing your orders for next season's supply write for further particulars, sample and prices after Oct. 1.

Our new process will be furnished only by ourselves and our authorized dealers and representatives.

THE A. I. ROOT CO.

MEDINA, OHIO

Early order discount for September cash orders is 6%